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TO READERS AND CORRESPONDENTS.

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THE

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ORIGINAL COMMUNICATIONS.

ARTICLE I.

Facts and Philosophy of Dental Progress. No. 1.

By PROFESSOR AUSTEN.

To the ALUMNI of the Baltimore College of Dental Surgery:—Gentlemen,—These papers are addressed to you, not because the subject to be treated has an interest limited to yourselves, but because my manner of treatment will be somewhat didactic. Men older than I in years and in professional experience might naturally resent a style of address suitable to the lecture room. But you who have been my pupils can bear with me, if I at times appear dogmatic. You will remember also that now, equally as when students, you are not to accept facts unless you find them to be true, nor inferences unless logically correct, and that any method or practice in art is to be adopted only when proved to be best, and retained no longer than it continues to be so. You will bear in mind, what I have always taught, that an unreasoning adoption of dogmas, formulas and practices is fatal to progress; that it is a duty, from which no student can be excused, to increase the sum

of human knowledge, by adding to ideas and experiences received, thoughts and an experience of his own.

I address these papers to you also, because they are designed to some extent, as supplemental to the teachings of past years—the *addenda* to some, the *corrigenda* to others. Science is guarded by a vigilant police who compel its teachers, like "little Joe" to "move on." They who by standing still obstruct the avenues of knowledge must turn aside or be trodden down. TRUTH is fixed and immutable: man's KNOWLEDGE thereof is progressive and changing. The lecturer is as much a student as the veriest tyro, necessarily from year to year modifying his instructions, and never so untrustworthy a teacher, as when he arrogates for his perceptions of truth that infallibility which belongs alone to the truth itself. That I should to day advise you not to do or believe some things, which in 1849 or 1859 I laid down as rule and practice, is a consequence of that DENTAL PROGRESS, the true principles and results of which will be the purpose of these papers to unfold.

Progress is literally a "going forward" we have this idea modified in the terms advancement, improvement, growth and increase. Motion towards some end is a necessity of our nature. As we advance in life we improve in skill, grow in wisdom, increase in knowledge, or else we progress downward—there is no standing still in moral, mental or artistic culture. So it is in Art and Science, but with important differences. The Man is a unit, ever increasing in power or else in weakness, growing wiser or else more ignorant, improving in virtue or progressing in crime, and the limit of a life completes (as to this world) the work of progress in either direction. But Science and Art are composite and in some sense immortal: individuals and generations contribute their share in the advancement of each, but they may also do much to retard.

The Individual may destroy himself or irreparably impair his physical, mental or moral organization: but Science is not thus at the mercy of any one man, or generation, and

may fully recover from the injury inflicted by an erratic genius, a sluggish age, or a false philosophy. On the other hand, no living man of the nineteenth century has any greater capability of moral, mental or physical growth, than had our first parents: he can never become more upright than JOB, more wise than SOLOMON or stronger than SAMPSON. Man then is the same to day (with certain impairments, which are irrelevent to the present subject) as on the day when he was created. God's universe and its laws are the same in every generation But man's knowledge, of that universe and comprehension of those laws are never the same in any age. Hence the knowledge of law which we call SCIENCE; the finding out things which have existed from creation, which we call DISCOVERY; the putting together of things and laws which we call INVENTION ; and the application of science, discovery, invention and skill to the various purposes of life which we call ART—will continue so long as truth lives, and there are finite minds to search it out, and they will be, in their very essence, progressive.

Progress in science and art, then, extends through generations ; it may move slowly, run in set channels, or be misdirected in some past age, yet in a subsequent one, make rapid and harmonious progress, perhaps to be obscured by a succeeding era of barbarism . We are accustomed to regard the present as peculiarly the age of Civilization and of Progress. And so, in many respects, it unquestionably is. But events are occurring around us calculated to awaken grave doubts—as to whether existing governments are in fact "the best the world ever saw" and whether modern Christianity is really any improvement upon that of the first century. In the domains of Art, Science and Literature, this much vaunted progress is on some points more than questionable, and scarcely justifies the braggadocio spirit of the age.

The much vaunted blessing of the art of printing has an attendant curse in the demoralizing influence of what we call "the press :" and the advantage of much *reading* is

offset by the disadvantage of little *thinking*. The nineteenth century has produced no poet greater than Homer, no moralist purer than Socrates, no logician superior to Aristotle: and even an American historian cannot condense into the same space more lies than did Heroditus. Architecture feebly copies the chaste models of the age of Pericles, or the grand structures of what we protestants term the Dark Ages. We try to imitate the power and beauty of Roman sculpture and mediæval painting; and confess our weakness by boasting that we can stain a piece of glass nearly as well as they did 1000 years ago, and can make pottery almost as wonderful as Palissy's. We spend our ingenuity in conjecturing how the immense stones of Balbec and Palmyra were set to place, with such marvelously accurate jointings, and we puzzle over the pyramids and monoliths of Egypt. All this too, in an age, which is eminently artistic and inventive. Clearly then there is reason to fear that, as in the days of Solomon, the world is but repeating itself.

And yet there are things "new under the sun." There is such a thing as progress, in its truest sense. Puritan hypocrisy and sectarian intolerance are signs of degeneracy: but Christianity regarded merely as a system of moral philosophy is immeasurably superior to all preceding systems by virtue of its distinguishing precept "to love and forgive:" and no argument of infidelity can rob it of this glory. The Vandals of the fifth century swept away Greek and Roman civilization; but they introduced that reverence for woman which, next to Christianity, has done most to place modern civilization so far in advance of those which were swept away.

Lord Bacon could reason no more accurately than Aristotle; but by establishing the laws of induction and connecting the reasoning with the perceptive faculties of man he changed the "syllogism," from being a plaything in the hands of the Schoolmen, into a mighty instrument for the discovery of truth. Our dwellings are not so grand as a

Grecian temple or a Gothic pile; but they are vastly more comfortable to live in. The light that comes through plain glass is not so gorgeous as if shed from a mediæval window, but it is far more useful and much more wholesome. This common, cheap thing which almost any poor man can buy, a 12 light 8 x 10 window, is in fact one of the most remarkable examples of the *unacknowledged* blessings given to us by the progress of modern civililization. We are surrounded by many such, but failing to recognize them, are found boasting of matters in which we are really far behind former ages.

Science is full of such blunders, suffering great truths to lie undetected and mistaking novelty for progress. All arts are filled with them; the dentist must carefully guard against them. To give examples, merely one of each kind, would fill volumes. I will state only one or two, taken from the history of medicine, and useful because of the practical lesson which may be drawn from them.

Paracelsus discovered in mercury a remedy of wonderful power, greater perhaps than is possessed by any single medicine. And yet it is no exaggeration to say that physicians since his day have by its means inflicted upon the human race tenfold more misery and suffering than it ever relieved. The discovery of Paracelsus was true progress; the uses made of it a most sad degeneration. But again, Hippocrates, the "father of medicine," nearly twenty-four hundred years ago, based all successful practice upon experience or experiment—that is, upon *empiricism;* for such is the precise meaning of the word which is now used as synonomous with charlatanism or quackery, to distinguish it from an educated or rational practice. Now of all systems of medical practice, the rational is the most *ir*-rational. With a materia medica made up of remedies discovered by empiricism, it looses most of the good to be derived therefrom by administering them in a "rational" way. A quack nostrum will do less harm and more good in the long run, than an apothecary shop dis-

pensed according to some elaborate theory as to *how* and *why* medicines do and should act.

The reluctance to admit our inability to explain the action of remedies, has been the plague-spot of medicine. Reason is worse than useless in therapeutics, except as it enables us to classify our experiments and make logical deductions therefrom. After more than two thousand years of rationalism, medical men are beginning to find that in surrendering EMPIRICISM to quacks they had given up the only true flag under which the "Art of Healing" can marshal its followers. The empiricism of Hippocrates was true progress; the rationalistic method of succeeding ages was a dangerous falling back, perpetually interfering with the usefulness of grand discoveries. Harvey's discovery of circulation made surgery both less painful and less fatal; but it is more than doubtlul if the theories of Cullen, Brown or Broussais helped to make the treatment of fever more successful than in the days of Galen.

These instances may teach the dental student two valuable lessons. A remedy, an operation or an appliance shall be useful within certain limits, and its introduction an evidence of true progress; yet, pushed beyond its legitimate use, it shall become an injury to both the art and the patient. Secondly, the value of any apparatus, process, material, or practice must not be measured by *arguments* urged in its favor. Everything that does not appeal directly to our five senses, must rest upon the testimony of past experience, or await the issue of experience yet to come. I shall have occasion, in subsequent papers, to show you that a disregard of these simple rules has greatly retarded the progress of dentistry.

You have heard and read much of the rapid progress of Dental Science. I propose in the next paper to inquire into the causes of this rapidity. We shall see how far it is peculiar to it—how far common to all art and science. We shall expect to learn from this inquiry the secret of progress, and may perhaps discover what constitutes the true character and dignity of Dentistry.

ARTICLE II.

Gold Foil.

THE manufacture of the Gold Foil used for filling teeth, has attained a greater perfection in this country than in any other, and the process is one of peculiar interest to the dental profession.

We are indebted to Mr. W. R. Abbey, of Charles Abbey and Sons, the oldest Gold Foil manufacturers in America, for the material of which this article is composed, it being a portion of one prepared for the new edition of Harris' Medical and Dental Dictionary.

Gold Foil as used by dentists for filling teeth, is gold hammered into a thin leaf, but finer in quality and of much greater thickness than the article ordinarily known as Gold Leaf. As at present supplied to the dentist, it is divided into Soft or Plain Gold Foil, and Adhesive Gold Foil, the appreciable difference between them being that the latter possesses the quality of adhering or welding together with much less pressure, when freshly prepared, than the former.

The thickness of the individual leaves or sheets is, or should be indicated by the expression of the weight in grains, of each sheet. Thus a sheet of No. 4 should weigh four grains, No. 5 five grains, and so on; consequently a Troy ounce of No. 4 contains 120 sheets, while the same weight of No. 6 will contain only 80 sheets. The numbers most in use are 4, 5, 6 and 8, though occasionally thicker numbers are called for.

When properly prepared, Gold Foil is made from absolutely *pure* gold, and particular attention given to the annealing process by the manufacturer; this latter is of as much importance as the former. There are various methods of freeing Gold from foreign matter or alloy, but the most effectual and certain method by which gold can be made absolutely pure is by dissolving it in Aqua Regia (Royal

Water,) a mixture of nitric and muriatic acids in proportion of one part of the former to four of the latter. The bullion to be refined (composed say of gold, silver and copper,) prepared by graining or passing through the rolls, is put into a glass matrass and a suitable quantity of the Aqua Regia poured on it, and then submitted to a heat in a water or sand bath. The gold and the copper are dissolved and remain in solution, while the silver is precipitated to the bottom of the mattrass as a chloride in a greyish white powder. The solution must be carefully decanted from the chloride into a solution of protosulphate of iron, at the bottom of which, after a short interval, the gold will be found precipitated in form of a reddish brown powder. This precipitate must be well digested in muriatic acid, then in boiling water, and after drying may be melted with a little borax.

The whole operation is a very delicate one, requiring considerable experience, and the exercise of great patience, care and attention, to ensure success.

The gold is cast into ingots about one inch wide, and portions of it (varying in weight according to the number intended to be made) are cut off and passed between fine steel rolls, until the proper thickness is reached, which for number 4 is when a piece of the "ribbon" one inch square will weigh about five grains.

Two hundred of these inch square pieces of gold are "filled" into the centre of a four inch square packet composed of pieces of vellum, or of a peculiar paper, a square of gold and a piece of the vellum or paper, alternating all the way through.

The packet which is technically called a "cutch" is then tightly encased on all sides by strong parchment casings, and is ready for "beating." The hammers used weigh from 12 to 16 pounds, and are wielded with one hand, the other being employed in regularly turning the cutch around and over, so as to bring every part of it equally under the hammer.

The beating is commenced upon the centre of the cutch where the squares of gold are piled, but as the squares enlarge by the force of the blows, the direction of the hammering is moved outward apace, the skill of the workman being proved by his ability to keep the enlarging gold in the cutch as nearly square as when started. The beating is continued until the edges of the gold are driven out beyond the edges of the cutch, when it is carefully scraped off and weighed from time to time, until the proper quantity has been taken off. The sheets of foil are then laid out from the cutch, the rough edges trimmed smooth and even, and they are ready for the process of softening or annealing. This is an important process and each manufacturer has his own method of doing it, the details of which are seldom made known. The general principle is, that by exposure to heat, the soft, kid-like quality of absolutely pure gold may be restored to sheets of foil that have been rendered hard, harsh, and unyielding by the hammering they have been subjected to. Some manufacturers do it by placing a sheet of the foil upon a wire grating, and holding it over a fire, or spirit lamp; others heat a plate of stone, and lay the gold upon it, whilst others again place it directly on a charcoal fire. After annealing, the foil is placed in books preparatory to exposure for sale.

ARTICLE III.

The File, as a Dental Instrument.

By W. W. H. Thackston, M.D., D.D.S.

Progress, is not always improvement. Change, as often travels downward, and backward, as upward and onward; and fashion, with its frailties and follies, plays not less fantastic tricks in the domain of science, than upon the broad surface of society. In this day of "radical" and startling change in the world without, and the world

within, it may be profitable to get back to some of the old "landmarks," and take a "new departure."

The furor for vulcanite and coralite, for cheoplasty and chisels, for gouges and drills, for automatic and pneumatic pluggers, for rubber wedges and wooden wedges, for *mallets*, and may we not anticipate,—for sledges and tilt-hammers, for amalgams, "Hill's stopping," Oxide of Zinc, and "Woods' metal," for shreded gold and sponge gold, for the thousand and one *new* things that thrust themselves upon us at every turn, has appeared from our point of view, to cause many to overlook, or almost forget, a great deal that is *old* and *tried*, and which has been found *true* and *reliable*, and among other things, one of the oldest, simplest and yet when intelligently used, one of the most valuable and efficient instruments ever placed in the hands of the dentist.

The file, if not forgotten, seems only to be remembered to be decried and denounced in some "new light" Dental Associations, where prayers and politics, psalm-singing and soft-soldering-dental patents and "duplex elliptics" combine in one harmonious and delightful *melange;* and abundantly betoken the present status, and illustrate the present progress of American Dentistry.

No one attaches greater value, or places a higher estimate upon the operation of "filling teeth" when the work is done in a proper manner, and with a suitable material, than the writer of this article. "Tooth-filling" must ever constitute one of the leading features in dental surgery, and excellence in this individual operation, may well repay, and richly compensate a lofty ambition. And further, no one has a higher appreciation of the better class of operations usually denominated "mechanical" or "artificial," these are all indispensable, and invaluable in their several and proper places.

But with the foregoing acknowledgment and concessions, we maintain, that the (now almost obsolete) use of the file, is equally necessary to the best results desirable

from correct dental practice—both in a prophylactic and remedial sense. A long, and somewhat critical observation in our own practice, and of the work of some of the Fathers of dental surgery (who have filled up the measure of their usefulness and honor, and passed away) as well as the practice of some of the most eminent who still survive, has abundantly satisfied us, that untold numbers of teeth are permitted to become the subjects of disease and decay, particularly upon their approximal surfaces, that might be protected, and preserved by the judicious use of the file. And more than this,—that *thousands* of teeth are sacrificed to a blind and over-weening confidence in the operation of " filling."

If compatible with the limits of this paper, or the object we have in view, we could present numerous and well authenticated instances in our own, and in the practice of more distinguished operators than we claim to be, of the permanent preservation of teeth by the file; which had been adjudged hopeless and incurable, so far as "filling" or any other operation could affect them, and which were *filed* as the only expedient, or experiment that could be applied. We have seen in the same denture, part of the teeth lost, under the best efforts of those most skilled in the operation of "filling;" and the remaining teeth, which had been abandoned as hopeless—a little mutilated, it is true, but sound and healthy, and satisfactorily performing all the functions peculiar to these organs.

We do not propose now to enter into any description of the *file*, its modifications of shape, its qualities of temper, cut or finish; nor do we design any observations upon the indications for its employment, or the best and most judicious methods of using this instrument, these subjects will all be more completely and clearly treated at another time, and in another place.

Our object in pening this article, is simply in our own plain way, to call back the attention of dentists, to an old, invaluable, but almost ignored or forgotten instrument;

which used with judgment and skill has, and will continue to confer on humanity a blessed boon ; and upon dental science, some of its proudest trophies, and most brilliant triumphs. We wish to direct in some degree, the attention of the profession, from utter absorption in the more *doubtful* and *questionable* features, methods and materials of modern dentistry ; and induce practitioners, to consider well, if they have not already lost a vast amount of valuable substance in the eager chase after shadows, if they are not throwing aside old and better friends, than they are likely to make from the ephemera of the present day. We are not inimical to *true* progress and improvement, we are not wedded to old things, *because* they are old ; but experience has taught us to repose very little confidence in, and attach very little value to what *is simply new.*

We may say in conclusion, that the opinions and reflections we have submitted, are not wholly peculiar, they are shared, we are persuaded by some of the abler members of the profession, and we anticipate ere long, an endorsement and a more full and clear presentation of every point touched, by one of the most distinguished of the Alumni of the Baltimore College.

ARTICLE IV.

Osmotic Action. A Lecture delivered February 14, 1867, at the Baltimore College of Dental Surgery. By H. R. Noel, M.D., Professor of Physiology.

Gentlemen :

At our last lecture we completed the review of Digestion. We assigned to each portion of the Digestive Tract its appropriate work—its office—its function ; and a similar disposition was made of the Digestive fluids.

Assuming now that Digestion has been thorough, complete, perfect in all respects and the mass of alimentary material fully prepared ; yet for all practical purposes it is thus far, though within the canal, yet without the system ;

for it has not yet entered the circulation, and this it must do before it can be blended with the circulating fluids, or can subserve the purpose of nutrition. The veins—the lacteals, the lymphatics and lymphatic glands, are to receive and work up this crude material into appropriate pabulum. How is this change of position accomplished? By what process is the canal emptied, and the vessels filled? By what subtle force—by what magic power is so rapid and complete a change of base effected?

The act is absorption. The force is Capillary Attraction aided and modified by certain chemico-vital processes.

The whole will be discussed as Osmosis or Osmotic Action.

Certain questions rise for solution. What is Osmosis? What is the theory of Osmotic Action? What are the laws? What are the conditions? What retards and what promotes it?

Lardner in his work upon Natural Philosophy defines Osmosis as "but a manifestation of Capillary Attraction."

Professor Draper says, "The absorbent action of the blood vessels depends upon a force known among physical writers as Capillary Attraction." Other writers give similar definitions.

Professor Dalton thinks "these phenomena depend upon the property belonging to animal membranes of imbibing or absorbing certain fluid substances in a peculiar way."

Do not understand from Prof. Dalton's vague statement, that animal membranes alone, have the power of exhibiting osmotic phenomena. The vegetable world exhibits the same. The inorganic world also has its share.

Osmosis itself does not depend upon vitality. Osmosis, pure and simple, may be shown to depend upon Capillary Attraction, and can be exhibited by "a dead animal membrane"—or by a "porous inorganic body." We shall therefore consider first Capillary Attraction.

With this you are more or less familiar—a few examples will serve to freshen the memory of your chemical and

philosophical studies, and bring up the knowledge acquired in the past. The rising of oil in the wick of your lamp,—water in a lump of sugar,—water permeating the walls of some of our houses, are examples.

If you dip a fine glass tube into water and remove it again, a small column of water will remain in the tube, held there against gravity by Capillary Attraction. By experimenting you will find, that the smaller the calibre of the opening in the tube, the higher is the column of retained water ; and we infer at once the stronger the Capillary Attraction. So this force bears some relation to the minuteness of the pores, and seems stronger as the pores are more minute.

Thus far we have a very simple problem, but complexity arises, and new elements are introduced the instant we attempt to make a practical application.

(1). Water rises fast enough in a fine glass tube.

(2). Mercury, though a fluid, *is depressed* below its *hydrostatic level.*

(3). Hydrofluoric acid quietly dissolves the tube itself.

Here we are at once brought to a halt, and conclude that all fluids will not pass through all pores indefinitely ; that the subject is becoming more intricate and new elements enter.

Allow me here to give you three propositions by Prof. Draper, as containing in a condensed form the very information we desire.

I. If the force of attraction of the particles of a solid for those of a liquid be not equal to half the cohesive force of the latter for each other, the liquid will refuse to pass through a pore of that solid substance, and in a capillary tube consisting of it, will be depressed below its hydrostatic level.

Example.—The mercury and glass tube—mercury depressed.

II. If the force of attraction of the particles of a solid for those of a liquid exceeds half of the cohesive force of

the latter for each other, but is not equal to the whole force, the liquid will pass through a pore of that solid substance, and in a capillary tube of it, will rise above its hydrostatic level.

Example.—Water and a fine glass tube—water rises in the tube.

III. If the force of attraction of the particles of a solid for those of a liquid exceeds the whole cohesive force of the latter, chemical union between them ensues.

Example.—Action of hydrofluoric acid upon the glass tube.

Here we have expressed certain laws of attraction of particles of fluids and solids; and the phenomena necessarily resulting from such laws; and in the study of osmotic phenomena as exhibited in the animal economy, we shall often have occasion to revert to them.

Remember the facts, as thus far given, have been in reference to a purely physical force; and we must expect some modification, some new phenomena, some new laws and conditions when we apply the force to vitalized structures. Many laws and conditions, many and varied phenomena arise and are grouped under the class of osmotic phenomena, but the combination of physical and vital forces, though mutually modifying, alter not the essential nature of either. As we shall have to deal with osmosis, animal membranes enter as the solid septa, and especially is this true when discussed in relation to Digestion. Moreover we deal with organized structures, vital forces, chemico-vital actions, &c., so that of course the subject at once loses its simplicity, but what it thus loses, is more than compensated by the beauty of the study and the intensity of the interest as we seek the physiological solution of the problem of life, in the blended yet harmonious action of the vital and physical. Lardner gives an example of osmosis and capillary attraction that is well worth our study, well worth a careful analysis, for it is rich in condensed information.

"A glass vessel is filled with alcohol—its surface and rim are securely covered, bound over with an animal membrane, this vessel is then immersed in a vessel of water, and the phenomena watched and explained."

(1). Water passes through the membrane to the alcohol.

(2). Alcohol passes through the membrane to the water.

(3). The water is impregnated with alcohol, and the alcohol is diluted with water—2 currents.

(4). The membrane covering the alcohol, gradually rises dome-like, arching above the vessel.

(5). Remove the glass vessel with its arching membrane, prick the membrane with a needle, and a small jet of water shoots up several feet.

Mark well each step as I repeat it;—remember the five divisions, and we will endeavor to analyze, explain and deduce conclusions.

Before proceeding further, allow me to make one or two other statements, simply a notice of certain facts bearing indirectly upon this experiment. Alcohol though kept in an animal membrane, a bladder for instance, will not penetrate the pores—will not reach the external surface and evaporate; water kept in this way will penetrate, will evaporate from the external surface. Alcohol diluted with water and placed in a like situation, gradually loses its water and acquires strength.

Water and alcohol both pass through the animal membrane; there are two currents—one of water and another of alcohol passing in opposite directions; the water current is the strongest and largest, for the membrane rises dome like over the glass vessel containing the now diluted alcohol, and this could only be caused by a rapid flow of water into the vessel. The jet of fluid rising several feet and the arching membrane, both give evidence of the development of a force. Water is heavier than alcohol, yet the stronger current is from water to alcohol. Water has an affini-

ty for animal membrane, alcohol has not; water will rise in the pores of these membranes; alcohol will not unless they be first filled with water.

Suppose we make divisions and classify the facts, classify our deductions as we analyze and arrange our conclusions under numerical heads.

GENERAL CONCLUSIONS.

(1). Animal membranes have pores through which fluids will pass and therefore they exhibit osmotic action.

(2). Different fluids have different affinities for animal membranes.

(3). In the experiment water had the strongest affinity.

(4). This stronger affinity developes and determines the direction of the stronger current.

(5). Water and alcohol having a mutual affinity for each other, mutually dissolve each other, or at any rate rapidly blend to an equality.

(6). Two fluids having a mutual affinity for each other, and separated by an animal membrane, will pass through and mingle, provided one or both have an affinity also for the membrane.

(7). A fluid in a membrane having no affinity for it, will not fill the pores of the membrane; unless, a second fluid having affinities for both should be upon the opposite side. Draper's first and second laws apply here.

(8). Perhaps in each pore of this membrane, there are two currents, a strong one of water going in; a weak one of alcohol coming out.

Endosmosis would represent the current of water, Exosmosis would represent the current of alcohol, not as regards strength but direction.

(9). The two currents seem to depend upon the fact that each fluid as it reaches the opposite side of the membrane is removed by solution in the other. Also that a current continuous and regular can be produced provided the fluid is removed as fast as it reaches the opposite side

of the membrane. Burning of a lamp—evaporation from skin, insensible perspiration, &c., all exemplify the action of this principle.

(10). A strong force is developed, as shown by the arching of the membrane, and also by the jet of fluid when the membrane is pricked. Remember therefore, that in separating fluids by animal membranes, a power may be developed:—and one by no means insignificant.

Affinities of fluids and membranes—currents and direction of currents—the conditions necessary for a current, conditions determining the direction of strongest current, the force developed and conditions of its action, are points to be remembered, as of value in the application of the theory of osmosis to absorption from the intestinal canal. Rigid experimentation—patient and persevering investigation of all the phenomena of life, careful analyses of these phenomena, have determined certain laws and conditions of osmotic action, as observed in the human body.

Headland and Chambers of London, in their admirable works, the one upon "Action of Medicines;" the other upon "The Indigestions," give about the following, as rules or laws as far as the subject is understood at the present time.

Laws.

I. Other things being equal the current is stronger from the lighter to the heavier fluid, and the strength of each current bears an increased ratio to its density.

II. Other things being equal—the attraction for the membrane, determines the direction of the stronger current; the fluid having strongest attraction passing rapidly through the membrane.

III. The stronger the affinity between the fluids, the more rapidly they diffuse, therefore the swifter the currents.

IV. The motion of one fluid promotes the flow in the direction of the moving current and the more rapid the current is flowing the more rapidly the osmotic current passes through to join it.

V. Pressure upon one side of the membrane determines the current through to the other; and this is eminently true.

VI. The current is increased from an acid to an alkaline fluid.

The activity of osmosis increases with temperature.

We will now endeavor to explain the practical application of these laws to the subject before us—absorption after digestion ; and bring in such collateral thoughts as may bear upon the discussion.

I. The law of Densities.

The lighter fluid passes more rapidly to the denser—and the rapidity of the currents is inversely proportional to their respective densities. Thus blood being heavier than the contents of the canal after complete digestion, the stronger current would be from the alimentary canal to the vessels. This statement may seem too broad, but is nevertheless true,—the blood is denser, is of greater specific gravity, than the contents of the canal after a thorough digestion. But in certain diseases, as acute anæmia for instance, the reverse may obtain and the blood having lost its solid constituents, may not regain these as rapidly as it does the water, and hence the vessels are filled with a fluid of less specific gravity than normal blood. The normal relation of quantity between the blood and vessels being lost, the vessels are rapidly filled by osmotic action from the fluids contained in surrounding structures, and the blood may regain its normal and natural fluidity by a partial inspissation of the tissues. But here we must at once step in, and assist nature by liquid alimentation, dilution of blood, &c., that the tissues may be compensated, and the blood kept at its normal fluidity.

The intense thirst of the wounded upon the battle-field depends upon these causes, for the blood is diminished in quantity, thickened, and from the whole system rises the demand for water, the solvent—water, the vehicle of conveyance. The vessels may partially fill themselves by osmotic action from the fluids bathing the tissues, but still this is robbing the tissues, and the demand for fluids is urgent and should be promptly met. Caution is necessary,

however, or by too prolonged and too free use of very dilute food, a condition simulating chronic anæmia may be induced. In fact you may get the blood at so low a specific gravity that this law may be possibly made to act the other way, and the current be from vessels to the canal. This would be a rare case however. Acute anæmia and chronic anæmia are two very different conditions as regards the system. In chronic anæmia the blood is watery, thin —of low specific gravity, and the tissues saturated with fluids which the lymphatics and various capillaries refuse to take up—for the law of density is reversed; affinity of the fluids changed; attraction of the fluids to the membranes prevented; so here are three laws at least, if no more, annulled for the time being. Solid food is probably best in this case, for we may get two advantages; first, avoid further dilution of the blood; second, by inverting the natural order, cause the too fluid blood to lose a part of its water in the dilution of the food ingested.

We can thus partially inspissate the blood, and the blood in turn may by osmotic action inspissate the tissues to regain its normal amount of water. Thus we obtain a double advantage. Diuretics and drastic carthartics are beneficial in dropsies, from this action, combined with others not bearing directly upon our subject.

II. Law.

Attraction for the membrane is a point not so well settled, but we will assume that the digested mass has stronger affinity and the current will be from canal to vessels. But there enters here a strong doubt as to the extent of our knowledge, and a great deal of theory must be admitted There are many substances that change or modify this affinity. Some preparations of iron perversely refuse to pass through the membranes into the vessels, and when exhibited as tonics are carried off in defecation, failing completely to exert any influence whatever upon the blood and tissues. The resinoid elements of aloes, myrrh,

colocynth, &c., are probably refused passage through the membrane, and exert a specific influence upon the canal in contact. Different substances have different affinities, and therefore different endosmotic powers; some, as the mineral acids for example, following the third law of Draper, actually corrode, dissolve and destroy the membrane. Some as tannic acid, &c., exert a constringing and condensing effect.

(Conclusion in our next number.)

ARTICLE V.

Death from Cardiac Neuralgia. Reported by EDWARD WARREN, M.D., Professor of Surgery, Washington University, Baltimore, Md.

MISS Elizabeth J. Jones, a lovely and interesting young lady of this city, aged eighteen, had been under my professional care, at various times, for the last twelve months.

During that period she had been the victim of repeated nervous attacks of an extraordinary character. These "attacks" were induced by the slightest cause which disturbed either her mental, moral or physical organization; and, alike in the violence of the hysterical symptoms by which they were characterized, and in the persistence with which they resisted treatment, exceeded anything of the kind within the compass of my observation. Accompanying these paroxyms, certain distressing neuralgic symptoms, connecting themselves with the uterus and the heart, were developed, for the relief of which chloroform was successfully employed on many occasions.

These neuralgic phenomena invariably disappeared with the subsidence of the hysterical "attacks," leaving no structural or organic lesion in either of the organs referred to, which the most thorough and accurate examination could detect.

Indeed, in the intervals between these "nervous attacks"

the uterus performed its functions with remarkable fidelity, while no unusual sound or movement disturbed the physiological monotony of the heart's action.

The last of these "attacks" preceding the one from which death resulted, occurred in February last, and was particularly violent and difficult of control.

She complained frequently of an acute pain in the heart, together with all the symptoms to which the term Angina Pectoris is applied by the authorities. After attempting a multitude of expedients, including the hypodermic use of morphia, I was constrained to employ chloroform, as had been repeatedly done before, until complete anæsthesia was produced.

Not an unfavorable symptom occurred, and the patient was not only greatly relieved, but really much benefitted by the remedy.

On the 27th of March last, she called at my office, and requested me to accompany her to the office of Professor Gorgas so as to be present and administer chloroform for the extraction of a tooth.

Having endeavored to dissuade her from taking the anæsthetic for so simple an operation, and finding that her mind was made up in this regard, and that her friends were fully aware of her intentions, I thought it my duty, at least, to see the dentist with her.

On the succeeding morning, I accompanied her to the office of Dr. Gorgas, and there learned from him that he had been unwilling to administer chloroform because of the supposed existence of some *serious organic disease of the heart*.

Having explained to *him* that the disease was nervous and not organic, that chloroform had been frequently used in her case not only with impunity but with positive benefit, and that there was, in reality, less danger to be apprehended in that instance than under ordinary circumstances, I then attempted to persuade *her* not to use the agent for so simple an operation as the one proposed.

This advice was given—not because even ordinary *danger* was apprehended in administering chloroform to one who had taken it so frequently with perfect safety—but upon the general principle that so simple and expeditious a procedure as the extraction of a tooth does not ordinarily justify the taking of any risk whatever, for the purpose of avoiding the pain incident to it. As a means of frightening her out of her determination, when argument and persuasion had both failed me, I exaggerated the dangers of inhaling chloroform in the semi-erect posture, and insisted that she should not incur them.

As a compromise, "Richardson's Spray Apparatus" was finally used, but the taste and smell of the ether proving unpleasant, she again insisted upon the chloroform, declaring that *she would take it if it killed her*, and protesting *that if her regular medical attendant declined to administer it, she would have it done by some one else.*

Finding that she was irrevocably determined to take the chloroform, and, having presented all the difficulties and dangers of such a step fairly to her mind, I concluded that my professional obligations in this connexion, had been fully met, and that it was my duty to see that the anæsthetic was properly administered.

Taking the precaution to approximate her position as near as possible to recumbency, to open her dress, to give her whiskey and water in advance, and to keep my hand constantly on her pulse, I proceeded to administer the chloroform from an ordinary towel so arranged as to admit the *free* ingress of atmospheric air into her lungs.

She was readily impressed by the agent, the tooth was rapidly extracted, and she speedily recovered sufficient consciousness and power of locomotion to walk into an adjoining room. Full anæsthesia was not produced, for she remembered what had been said and done while apparently insensible, and chatted laughingly about it before she left the dental chair. Her pulse remained so quiet, and her respiration was so slightly disturbed during the

whole period of slumber, as to induce me to call the especial attention of Dr. Gorgas to the tranquility with which these functions were performed.

After remaining about half an hour upon the sofa in an adjoining room, talking pleasantly with her companion and myself, she got up, washed her face, adjusted her hair and insisted on visiting a relative on Preston street, some mile and a half distant. To my remonstrances against the imprudence of leaving the office so speedily, and walking at all, she replied that she was "perfectly well," and went skipping gaily out of the door in advance of me.

She then took my arm and walked about half a mile, to her mother's house, on Calvert street.

Upon reaching home, she appeared somewhat nervous and hysterical, but much less so than I had a right to expect from the excitement and fatigue to which she had been subjected, and than more trivial circumstances had induced on many previous occasions. She was perfectly intelligent; there was no drowsiness; and nothing approaching to the "anæsthetic condition" presented itself at that time, or afterwards. Some whiskey was administered, and she seemed to be doing well.

Just at this period the young lady who had accompanied her to the dental office, and who had been greatly interested and excited by what had occurred there, fell upon the floor in a violent paroxysm of hysteria. As her health was delicate and such attacks unusual, I was extremely solicitous on her account, and, for some time gave my attention exclusively to her.

After she had been removed to another chamber, placed in bed, and morphia administered subcutaneously, I went to look after my first patient, and found, to my great regret, that the additional excitement had been too much for her, and that one of her regular "attacks" had devoloped itself in the interval. She was still sensible—so much so as to be able to talk about her condition, and to assist in undressing herself—but the hysterical symptoms were mo-

mentarily growing more violent, and an acute pain locating itself alternately in the uterus and heart, was complained of.

One-quarter of a grain of morphia in solution was then injected into her arm, at her solicitation—the pulse never having been depressed by the action of the chloroform. Two hours and a-half after the use of this remedy, as the pain had increased, and there was neither abatement of the nervous symptoms nor the least disposition to somnolency, the same quantity of the narcotic—one-quarter of a grain in solution—was again employed in a similar manner.

Other engagements called me soon afterwards from the house, but I learn that she gradually became more composed, and finally slept. Her friends inform me that there was no stertorous breathing, no unnatural slowness or irregularity of pulse, no alterations of the countenance, no dampness and coldness of the surface, and in fact, none of those peculiar symptoms by which *narcotism* is so infallibly indicated, and so readily diagnosed.

About half-past seven in the evening, more than eight hours after the use of the chloroform, her friends were startled by a gurgling sound with slight struggling, and hastening to her room, found her in a sinking condition.

Professor H. L. Byrd, who resides in the immediate neighborhood, was hastily summoned, and in vain attempted to revive her. Under his judicious treatment her pulse rallied for a few moments, but sank again into the profound quiescence of death. I reached the room just as the last expiration released her lovely spirit from its earthly tenement and sent it forth on its heavenward journey. Her extremities were still warm; her countenance was tranquil and natural; her pupils were not contracted; and every thing indicated that death had been sudden, and that it had commenced at the heart.

Three questions naturally suggest themselves, in this connection, which require satisfactory answers.

I. Why was chloroform administered at all, to a patient suffering from disease of the heart?

To this I would respond, *firstly*, that the medical attendant, after exhausting argument and entreaty, was constrained to yield to the wishes of the young lady, in order to prevent the administration of the anæsthetic by an inexperienced hand, and that it *might be properly done*:

Secondly, That the disease in question was not structural or organic, but exclusively nervous or functional—a species of angina pectoris—and that, according to the teachings of every man of recognized position and authority, in the profession, chloroform is *par excellence* the appropriate remedy for such affections: and, *thirdly*, that on many previous occasions, both with my sanction and without it, she had used this agent with positive impunity.

II. Was the patient's fate hastened by the remedies employed?

The answer to this question is equally plain and satisfactory. Chloroform produces its toxic effects by overwhelming the medulla oblongata, and thus paralyzing the organs and suspending the functions which are presided over by that great centre. This result, from the very nature of things, is never postponed, but is instantaneous. The patient dies while under the immediate influence of the drug—death takes place upon the table while anæsthesia exists. The heart ceases to beat at that period when the medulla is most under the control of this subtle but powerful agent. The danger is directly proportional to the profundity and persistence of the anæsthetic condition, and inversely so to the rapidity and completeness of the recovery—to the return to consciousness, feeling and mobility.

Nor does anæsthesia reproduce itself. Its subsidence is a finality. Each moment serves to eliminate from the blood more and more of the agent upon which this peculiar condition depends, and to increase the difficulties of its re-development.

In this instance, the patient passed safely through the

period of danger—neither heart, lungs, nor brain were injuriously impressed by the agent. Her recovery was rapid and complete. No sign or symptom—not the slightest trace or indication—of the anæsthetic condition was developed at any subsequent period in the history of the case, and sufficient time—more than eight hours—had elapsed to preclude the contingency of its re-appearance.

Again, the observations of medical men throughout the world, have established, that however dangerous it may be in its *primary* influence upon the economy, its *secondary* effect is to induce repose, rest, tranquility throughout the nervous system. In the Italian campaign of 1859, this fact was demonstrated in thirty thousand instances, there being no exception to the general rule. Mr. McLeod, in his Surgical Notes on the Crimean War, reports twenty thousand cases in which the same truth was exemplified. My own experience, together with that of multitudes of surgeons who served on either side in the late struggle, sustains this conclusion to the fullest and farthest extent.

The previous history of Miss Jones' case convinces me that some tranquilizing but not depressing influence was exerted upon her by the secondary action of the chloroform, as she was much less nervous up to the attack of her friend than she had frequently been made by the most trivial circumstance when no such restraining power was in operation.

So far as the hypodermic use of the morphia is concerned the whole matter is readily disposed of.

She had repeatedly taken as much as a *whole grain* by this method, with impunity; the dose was too small a one to produce injurious effects *under any circumstances*, and her condition immediately preceding and succeeding her death, furnishes the most incontestable proof that she was *not narcotised.*

III. Did she really die of disease of the heart?

It has been demonstrated that neither the chloroform nor the morphia was instrumental in bringing about the sad termination. It has, also, been shown that she suffered at

times from a most painful and dangerous affection of her heart—from a disease of that organ which had repeatedly placed her life in jeopardy. These circumstances, taken in conjunction with the suddenness of her demise, with the intense pain previously experienced in the præcordial region, and with the condition of the body after death, her warm extremities, natural countenance, dry skin, normal pupils, &c., point with unerring certainty to the heart as the point from which the fatal shaft was hurled.

Apart from these *a priori* reasonings, this position is rendered impregnable by the testimony of the only competent witness to the closing scene of this unfortunate lady's life. Professor Byrd, whose ability to form a correct judgment cannot be questioned, and to whom alone was furnished an opportunity to arrive at an intelligent conclusion in this connection, gives it as his unqualified belief that she "died of disease of the heart." His written opinion is appended to this paper. My own convictions fully accord with his; and I feel assured that such will be the deliberate judgment of any intelligent and honest professional man who carefully considers the facts embodied in this article.

I have, therefore, no hesitation in announcing that Miss Jones died of *cardiac neuralgia* incident to an attack of hysteria—a disease from which she had suffered intensely during a great portion of her brief existence.

The following statements will, without doubt, place the whole matter in its proper light before both professions.

STATEMENT OF PROFESSOR GORGAS.

BALTIMORE, *April* 15, 1867.

PROF. EDWARD WARREN—*Dear Sir:*

I have carefully read the statements contained in the above article, and take pleasure in bearing the most emphatic testimony to their correctness, so far as they relate to what transpired in my presence.

I had declined to administer chloroform in the case of Miss Jones, for the reason, that she informed me that she was subject to a serious *affection of the heart.* Of the nature of that disease, I had not enjoyed an opportunity to inform myself; and my objections to taking the responsibility of using the anæsthetic, were based upon the general rule which has been established on this subject.

On the 28th of March last Miss Jones called at my office with you, and again insisted upon taking chloroform.

In response to our united efforts to dissuade her from so doing, she replied positively, that *she would take the chloroform if it killed her*, and that, if *you refused to comply with her request she would have it administered by some one else.*

"Richardson's Spray Apparatus" was then tried, but so soon as the ether came in contact with her mouth, she refused to submit to the application, but again declared she would have chloroform.

Entreaty was once more attempted but in vain. The dangers incident to the inhalation of chloroform in an erect position were presented to her, without effect; you then administered the chloroform, and I extracted the tooth. She rapidly recovered from the effect of this agent, and in about half an hour, left my office apparently perfectly well. In response to your persuasion to remain longer, or at least to ride home in a hack, she replied that she was "going to Preston street to see a relative," and actually ran, laughing and talking, out of the door in advance of her friends, to all appearances, in as good health as she ever was. I regarded her recovery from the anæsthetic state as complete.

An experience of ten years in the use of anæsthetic agents enables me to say, that a more careful and skilful administration of chloroform could not have been made. A very small quantity of the agent was used, and every possible precaution that science and experience could suggest was taken to prevent a fatal result.

I have no idea that the chloroform had anything to do

with her death, but am convinced that she died from "disease of the heart."

Yours, very truly, &c.
F. J. S. Gorgas, M.D.,
Prof. of Dental Surgery in Baltimore College.

STATEMENT OF PROF. BYRD.

No. 21 *North Calvert Street.*

Baltimore, *April* 4, 1867.

Prof. Edward Warren—*My Dear Doctor:*

In response to your request for an expression of my professional opinion in regard to the cause of the death of Miss E. J. Jones, I have to say that it is my belief that she died *from disease of the heart.*

Very respectfully, your obe't servant,
H. L. Byrd, M.D

ARTICLE VI.

Fillings vs. "Plugs," et Introducers vs. "Pluggers.

By Andrew B. Brookins, D.D.S.

It is a matter of surprise that so many of our first-class operators still continue the use of these inexpressive, inelegant, unprofessional terms.

That "gutter-dentists," as Dr. Atkinson facetiously calls them, who have mechanically attached themselves to our profession, with parasitic tenacity, as the sponge to the sea-girt rock of the Grecian Archipelago, or barnacles to an East Indiaman, should bring along with them barbarism and inelegance, is a matter of no great surprise, being isolated and irresponsible; desiring their patients to be no better informed than themselves, and ignoring as innovations the right use of correct language.

We cannot take up a Dental Catalogue but the words "plugs, pluggers," &c., haunt us from beginning to the conclusion, like the ghost of Hamlet, and one does not feel relieved until he has run his pencil through these intractable "plug-uglies" and writes on the margin the proper representatives.

It is a painful commentary on our profession that proper language cannot be universally used to express proper ideas in the advancement of our professional status.

We have no right to expect the commonalty to be cognizant of professional terms till we educate them, and we cannot do this till we educate ourselves. We cannot give a dollar if we do not possess it.

ARTICLE VII.

Aluminum.

By JAMES B. BEAN, D.D.S.

THIS metal is named from *alumen*, the Latin term for alum, which is a double salt of potassa and the earth alumina combined with sulphuric acid. The name *aluminium* has been adopted by some writers, but we can see no just reason for this orthography; *alumium* would have been more consistent with our own word *alum;* and for the sake of euphony or uniformity of termination, we might also say *platinium* or *tantalium* in place of platinum or tantalum.

The chemical symbol of aluminum is Al., its combining number is 13.7 and its specific gravity about 2.30 when cast, but may be increased to 2.60 by hammering or rolling.

The sesquioxide, or alumina is the only compound of this metal with oxygen, and is so called because of its isomorphism with the sesquioxide of iron. The metal aluminum thus combined with oxygen and other elements is more

abundant on the earth than any other of this class of bodies that has been rendered useful in the arts in its metallic state. As well as being the principal component of all clays, which are combinations of sesquioxide of aluminum with silicic acid, it is a large constituent of all granites and felspathic rocks, and appears in a state of purity in the precious gems sapphire and ruby. Corundum and emery are also nearly pure alumina.

Aluminum, formerly known to chemists only as a gray powder resembling spongy platinum, is now prepared in large quantities in France and England by the decomposition of the chloride or fluoride by sodium. The chloride of aluminum is prepared on the large scale by passing chlorine over a previously ignited mixture of clay and coal-tar in retorts like those used in the preparation of coal gas, and is either made to pass into a chamber lined with plates of earthenware, where it condenses into a compact crystalline mass; or the vapor is made to pass over chloride of sodium at a red heat, whereby it is converted into the double chloride of aluminum and sodium. To effect the reduction, 400 parts of this double salt, 200 parts of chloride of sodium, 200 parts of fluor spar, (or better cryolite,) all perfectly dry and finely powdered, are mixed together, and the mixture placed, together with 75 or 80 parts of sodium, in an earthen crucible, the saline mixture and the sodium being deposited in alternate layers. The crucible is then moderately heated till the action begins, afterwards to redness, the melted mass stirred with an earthenware rod and afterwards poured out. Twenty parts of aluminum are thus obtained in a compact lump, and about five parts in globules encrusted with a gray mass. (*H. Ste-Claire Deville.*)

Since the great improvement of Deville in the production of this metal on the large scale, it has attracted considerable attention from the manufacturing as well as the scientific world; and within the past few years, the dental profession have looked forward with much interest to the

time when aluminum should be successfully adapted to use as a base for artificial teeth. Then to a cursory view of the properties of the metal under consideration which more immediately concern its manipulation in the dental laboratory, together with the progress of the recent experiments of the writer in casting plates for artificial teeth, will conclude this brief article.

Aluminum is peculiarly suited to the construction of bases of artificial teeth, and more particularly for upper sets. When cast, in its pure state, it is less than one-fourth the weight of an equal bulk of silver, about one-eighth the weight of gold, and little more than one-tenth the weight of an equal bulk of platinum. It is nearly as strong and rigid as an equal thickness of wrought iron; it is as tenacious as ordinary cast brass, and will bend back and forth several times before breaking. Its whiteness and lustre when polished rivals that of silver, and when burnished attains a brilliancy more lasting under wear than that of silver. When heated, aluminum attains a pasty condition as it approaches a red heat, and at a cherry red it is quite fluid, yet remains very sluggish in its movements, owing to its extreme lightness and the thin skin of oxide that seems to envelope the mass. At a bright red heat it still remains unaltered by contact with the air, but at a white heat it takes fire and burns with a brilliant flame, leaving behind a mass of fused corundum. Nitric and sulphuric acids have no perceptible action on aluminum at common temperatures, but boiling nitric acid attacks it with about the rapidity that aqua regia does pure gold. Hydrochloric acid attacks it at ordinary temperatures, slowly dissolving it with the evolution of hydrogen gas. Acetic acid in a concentrated state, exposed to the open air, dissolves it very slowly after one or two day's immersion, but common vinegar has no perceptible action. Sulphuretted hydrogen, which is the most common agent that attacks silver and even gold plates in the mouth, has no action whatever on pure aluminum. Its

permanence in the mouth will undoubtedly be equal to gold or platinum ; pieces that have been worn in the mouth for weeks even without cleaning, under the immediate observation of the writer, showed no action whatever by the fluids of the mouth.

Many gentlemen in the dental profession have been carefully experimenting, in view of making a successful application of this excellent metal to our purposes; but as yet, so far as is known to the writer, no one has succeeded in *casting* a satisfactory plate with teeth attached, which would fit the mouth, until his experiments proved successful a few weeks ago, after months of discouraging and laborious investigation and experimenting. The writer succeeded in casting a plate in 1860, but was unable to produce a plate with uncracked teeth attached until last November, and the prodigious shrinkage of the metal was not overcome so as to make a perfect fit to the mouth, until within the last two or three months. It is now confidently asserted, that in a very short time the process will be developed in its details, and the apparatus prepared for using it so as to offer it to the profession for successful application. Since the production of the article published in the April number of the DENTAL COSMOS, page 470, current volume, the writer has made many important improvements, and others are yet under trial, he must therefore ask his brethren of the profession to be patient, and they shall have the benefit of all of these improvements in due time. No great improvement in an art like this is quickly developed, and it is not desirable that these experiments should be given out until perfected, or at least reduced to a practical form.

For the information of dentists, the writer would state that as soon as there is a demand for the metal, it will be imported and for sale in bars at the Dental Depots. Its present price is $2.00 to $2.50 per oz., in gold; and plates will rarely weigh over one ounce. The apparatus and outfit for making aluminum work will be less expensive than

that for vulcanite work, and much easier kept in order. The labor of making a set on aluminum will be about that of first-class gold work, and it gives room for an almost unlimited amount of skill in accomplishing its perfection, consequently it will largely tend to the elevation and highest developement of our art.

The writer would not use aluminum for lower sets, although it is as easily applied to these, yet its lightness and strength is its great recommendation for upper sets; and there is nothing better than pure tin, or an alloy of tin and silver, for lower sets, as we want these as compact and heavy as possible.

The Association of the Colleges of Dentistry.

THE Association of the Colleges of Dentistry met in the lecture room of the Philadelphia Dental College, in Philadelphia, on Wednesday, March 20, 1867, at 10 o'clock, A. M.

Professor E. Parmley, President in the Chair.

There were present from the Baltimore Dental College, Professors P. H. Austen, F. J. S. Gorgas; Ohio Dental College, Prof. J. Taft; Penna. Dental College, Profs. T. L. Buckingham, George T. Barker, E. Wildman, W. S. Forbes, J. Truman; Philadelphia Dental College, Profs. J. H. McQuillen, J. F. Flagg, Thomas Wardle, C. A. Kingsbury and J. E. Garretson; New York Dental College, Profs. E. Parmley, F. D. Weisse, N. W. Kingsley, R. King Brown.

The minutes of the last meeting were read and approved.

The name of Prof. H. Judd, of the Missouri College of Dentistry, was presented for membership in this Association.

A committee of three was appointed to receive and report upon the application.

Committee consisted of Profs. George T. Barker, N. W. Kingsley and J. H. McQuillen.

After due deliberation, the committee made the following report:

We have examined the credentials of Prof. H. Judd as a delegate to this Association, and would respectfully report that owing to the peculiar position in which the institution now stands that he represents, we do not feel at liberty to recommend him as a member of this body, but would suggest that for the present he be invited to be present at the sessions of this meeting, and take part in the deliberations.

On motion of Prof. Weisse,

Resolved. That the resolutions presented, considered and approved at the last meeting of this Association be now taken up and adopted; after which, the following resolutions constituting regulations for all the Colleges represented in this body were discussed, pending which the Association adjourned to meet in the lecture room of the Penn. Dental College, at 3½ o'clock, P. M.

AFTERNOON SESSION.

The Association met at 4½ o'clock, P. M., at the place designated by the adjournment.

Minutes of the morning session were read and approved.

The following regulations and by-laws were now adopted

I. That the rule of our Dental Colleges allowing one session in a medical college to be considered equivalent to one course in a Dental College be abolished.

II. That two full years of pupilage with a reputable Dental practitioner, inclusive of two complete courses of lectures in a Dental College, be required to entitle the candidate to an examination for graduation for the degree of D.D.S.

III. That a graduate of a respectable medical college, who has been under the pupilage of a reputable Dentist for one year, and shall have attended one full course of lectures in a Dental College, shall be entitled to examination for the degree of D.D.S.

IV. That eight years of Dental practice, including regular pupilage, will be regarded as equivalent to one course of lectures.

V. That the regular term of instruction in the Dental Colleges, be five months, the sessions in each to commence on the fifteenth day of October, annually.

VI. That students entering the Colleges later than the 10th of November, will not be credited for a full course, nor be eligible to graduation at the same term.

VII. That a candidate for graduation will be required to furnish a written certificate of having fulfilled the required pupilage, or period of practice.

VIII. Regarding the education ef the profession as the primary and only object in the establishment of Dental Colleges, therefore,

Resolved, That whilst this Association does not forbid, it cannot approve the conferring of degrees upon persons who have not complied with the regulations agreed upon by this body, with the exception of gentlemen who have distinguished themselves as contributors to Dental science.

The regulation marked number eight was *very* warmly and earnestly discussed by almost all the members ; pending which, a motion was made by Prof. George T. Barker to lay it on the table. The vote upon this motion being taken by Colleges was as follows :

Yea, Penn. Dental College.

Nays, Baltimore Dental College ; Ohio Dental College ; Philadelphia Dental College ; New York Dental College.

After some further discussion, and amendment of the resolution by Prof. Austen, the vote upon it was taken, and was as follows :

Yeas, Baltimore Dental College ; Ohio Dental College ; Philadelphia Dental College ; New York Dental College.

Nay, Penn. Dental College.

Immediately after this vote, the Faculty of the Penn. Dental College, announced through their Dean, that the passage of this resolution rendered it necessary for them

to withdraw from this Association, alleging for this movement their conviction that it is a rebuke upon their past practice of conferring degrees upon practitioners of Dentistry, and also a restriction upon their intended future course in this respect.

SECOND DAY. MORNING SESSION.

Thursday morning, 9 o'clock.

Association met according to appointment, in the lecture room of the Philadelphia Dental College.

The minutes of the last meeting were read and approved.

Dr. James E. Garretson presented the following:

Resolved, That we recognize that the truest dignity of the Dental, as any other specialty, is found alone in the education of its practitioners, and that this education should be one common to all medical men, and that it be the object of this Association of Colleges to so educate their students—advancing to this object as rapidly as circumstances seem to warrant, thus merging the specialty into the common mother practice.

This resolution called forth some earnest discussion, after which, the following was submitted by Prof. B. King Brown:

Honoring the sentiments which animate Dr. Garretson in the presentation of his resolution, and favoring the fullest and most ample instructions on the part of Dental Colleges, but considering that a matter which should be left to the different Faculties, I respectfully move that the resolution be laid on the table.

On motion of Prof. Weisse:

Resolved, That we reconsider the action of yesterday, in regard to the reception of Prof. H. Judd, of the Missouri Dental College as a member of this Association.

The vote was unanimous for the reconsideration.

On motion of Prof. Weisse:

Resolved, That on the establishment in the Missouri Dental College of such additional Chairs as are regarded by

this Association necessary to qualify Dental practitioners, viz: those of Operative and Mechanical Dentistry, the said Faculty shall become *ipso facto* members of this Association.

On motion of Dr. McQuillen:

Resolved, That the next annual sessions of the Colleges begin on the 15th day of October, 1867.

On motion of Dr. Kingsley:

Resolved, That when this Association adjourn, it be to meet in the city of New York on the 19th day of March, 1868.

It was moved that the expenses of the Association be paid by an assessment on the Colleges.

On motion of Dr. Weiss:

Resolved, That the Secretary be requested to have the Constitution, By-Laws and Regulations of this Association stereotyped, for printing sheets for distribution to the different Faculties.

J. Taft was appointed Treasurer of the Association.

A vote of thanks was tendered to the Faculties of the Dental Colleges of Philadelphia, for the courtesy and kindness received at their hands by this Association during its sessions here.

The various Faculties, in the person of their various official officers, signed the Constitution and By-Laws, after which the Association adjourned to meet in the city of New York on the 19th of March, 1868.

J. Taft,
Secretary.

Dental College Commencements.

Baltimore College of Dental Surgery.

The *twenty-seventh* annual commencement of the Baltimore College of Dental Surgery was held at the Concordia Building, Baltimore, on Thursday evening, February 28, 1867.

The exercises of the occasion were opened with prayer by the Rev. Dr. G. C. M. Roberts. The names of the Graduates were then announced, and the degree of "Doctor of Dental Surgery" was conferred by the Dean of the Faculty, Prof. F. J. S. Gorgas, upon the following gentlemen:—Hugh Wilson Arthur, Md.; Warner Julian Bailey, Miss.; John Robert Barr, Ala.; Thomas Ligget Beckenbaugh, Md.; J. Robson Bromwell, Md.; Walter Bruce, Va.; Andrew Simon Cutler, Ind.; Augustus Boyd Doremus, La.; Joshua Stevenson Dorsey, Md.; John Francis Ruter Dufour, Dist. of C.; Joseph Root England, Md.; John d'Oyley Evans, France; William Farmer, Va.; James Taliaferro Grant, Tenn.; Silon Homer Henkel, Va.; James Hogg, Md.; B. Rush Jennings, Md.; Henry R. Johnson, Va; Harry Galbraith Leas, Pa; Algernon Mosely Lee, M.D., N. C.; Alfred Fitzgerald Malone, Fla.; George William Massamore, Md.; Isaac Carrington Morton, Va.; James William Miller, Va.; Charles A. Norwood, Md.; Robert Lyon Seale, M. D., Ala; Isaiah Simpson, S. C.; Ezekiel Cooper Stockton, M.D., Pa.; George N. Swormstedt, Ind.; Marion Elisha Tarvin, Ala.; John Charles Uhler, Md.

After this part of the ceremony had been concluded, the valedictory address was delivered by Prof. Russell Murdoch. Some remarks were then made by Prof. Thomas E. Bond, at the conclusion of which the benediction was pronounced by the Rev. Dr. Roberts. The large and beautiful hall was filled with the friends and acquaintances of the graduates, and the excellent music of the "Blues' Band" tended greatly to enliven the scene.

It will no doubt be gratifying to the friends of the Baltimore College to announce that the number of matriculants was almost double that of the previous session, and that the graduating class numbered *thirty-one.*

The faculty were much gratified at the presence of a number of the former graduates of the institution, gentlemen whom they feel proud to number among its Alumni.

The following change in the faculty was also announced; Dr. H. H. Keech having resigned the Demonstratorship of Operative Dentistry, Dr. Hugh McGinnis Grant, of Abingdon, Virginia, of the class of 1855, has been appointed Demonstrator of Operative Dentistry.

Ohio College of Dental Surgery.

The *twenty-first* annual commencement of this College was held in the hall of the College Building, Cincinnati, March 6th, 1867. The degree of "Doctor of Dental Surgery" was conferred by Dr. James Taylor, President of the Board of Trustees, on the following gentlemen:

W. C. Stanley, F. McGinniss, F. Peabody, G. W. Field, H. L. Ambler, J. T. Child, B. Eaton, P. T. Clark, W. A. Grahame, R. F. Ludwig, J. R. Irelan, J. Ropp.

The valedictory was read by Prof. Spalding, on account of the absence of Dr. Richardson, by whom it was written.

The graduating class numbered twelve.

Pennsylvania College of Dental Surgery.

The *eleventh* annual commencement of this College was held at Musical Fund Hall, Philadelphia, March 1st, 1867.

The degree of "Doctor of Dental Surgery" was conferred by Dr. W. W. Fouche, upon the following gentlemen, who were regular students in attendance upon the lectures, twenty-six in number:

Stephen Armos, Cuba; John Aspinwall, Jr., Mass.; Edward M. Beesly, N. J.; Charles Bulkley, Pa.; John N. Crouse, Ill.; Charles H. Darby, Mo.; Frank Darby, N. Y.; Squire C. Dayan, N. Y.; James W Gurley, Or.; Robert Huey, Pa.; James Lewis, Vt.; David R. Martin, Pa.; Mariano Martorell, Porto Rico; John Q. McDavid, S. C.; Henry W. Moore, Pa.; Gonzalo Orue, Cuba; Casimiro Portillo, Cuba; George L. Rauch, Pa.; John S. Smith, Pa.; James A. Sheldon, N. Y.; Clinton W. Strang, N. Y.; James Taylor, England; George R. Thomas, Pa.; Francisco Vega, Porto Rico; H. Meredith White, M.D., Pa.; Joseph F. Winslow, N. Y.

The same degree was also conferred upon the following gentlemen, who have been in practice since 1852, but who were not required to attend the lectures of the institution, a course which it will be seen by reference to the proceedings of the Association of Dental Colleges, is disapproof by all the other Colleges:

G. C. Brown, N. J.; J. F. Leaming, N. J.; D. R. Greenlee, Pa.; J. H. Githens, Pa.; Spenser Roberts, Pa.; Amos Wirt, Pa.; A. R. Robbins, Pa.; Benjamin Wood, N. Y.; C. A. Marvin, N. Y.; W. C. Parks, N. Y.; G. H. Perine, N. Y.; C. E. Francis, N. Y.; W. B. Hurd, N. Y.; T. Burgh, N. Y.; S. Hassell, N. Y.; A. L. Northrop, N. Y.; Enos G. Ray, N. Y.; T. H. Musgrove, Md.; W. W. Russell, Mass.; J. A. Salmon, Mass.; E. G. Leach, Mass.; D. S. Dickerman, Mass.; Chester Heath, N. H.

The valedictory was delivered by Prof. T. L. Buckingham.

Philadelphia Dental College.

The *fourth* annual Commencement of this College was held at Musical Fund Hall, Philadelphia, March 1, 1867.

The degree of "Doctor of Dental Surgery" was conferred by Rev. Richard Newton, D.D, upon the following gentlemen, thirty in number:

Julian J. Anderson, Mass.; Stephen T. Beale, Jr., Penn.; James E. Blanchard, La.; Frederick K. Crosby, Conn.; Charles M. Curtis, Penn.; Roger Cutlar, N. C.; Charles V. Du Bouchett, Penn.; George P. Franklin, Penn.; Henry L. Gilmour, Ireland; Edward Goertz, Germany; Daniel G. Harkins, Mass.; William C. Head, Penn.; Arthur Holbrook, Wis.; William H. Howard, Penn.; Frank A. Hunter, N. Y.; John G. James, N. C.; M. Lukens Long, Penn.; Andrew F. McAvenney, N. B.; Lewis P. Meredith, Ohio; Edward D. Moore, Ohio; George B. Morris, W. Va.; George S. Nyce, Penn.; John J. Pitts, N. Y.; John Powers, Maine; Henry A. Robinson, Maine; David D. Smith, Mass.; Leopold M. Townsley, Mo.; Carl R. Walther, Germany; Marshall H. Webb, Penn.; Otis C. White, Mass.

The valedictory was delivered by Prof. Thomas Wardle.

New York College of Dentistry.

The *first* annual Commencement of this College was held at Steinway Hall, New York, March 6th, 1867. The degree of "Doctor of Dental Surgery" was conferred by Prof. Eleazar Parmly upon the following gentlemen, nine in number:

C. D. Allen, W. C. Horne, J. W. Lyon, N. Y.; J. F. P. Hodgson, Ithaca, N. Y.; R. W. Browne, Conn.; G. Bernard, Wash. Ter.; W. D. Tucker, Tenn; W. Dutch, California; C. F. Meyer, Germany.

The valedictory was delivered by Dr. W. W. Allport.

MONTHLY SUMMARY.

Blood Corpuscles.—Different opinions have been expressed by recent microscopical observers upon the constitution of these bodies. Thus Ofsiannikof says that they possess an investing membrane or proper cell-wall, which re-acts differently from the contents. He has observed that crystallization occasionally occurs in the corpuscles while still floating in their own serum, and thinks that many of the changes in form, attributed to the influence of certain reagents, really occur within the corpuscles.

Schultze, however, examining blood which was kept on a peculiar slide at its own temperature, comes to the conclusion that the corpuscles are destitute of investing membrane. Of white corpuscles, he found some smaller than the red ones, some of equal size, and the rest of the typical form. These last exhibited lively and vigorous movements. He belives them too to be destitute of an investing membrane. Their movements cease after two or three hour's exposure to a heat of 100° F. Above this point they soon die, but keep active for twenty hours at 32°.

The red corpuscles exhibit no movement, but when heated to 125° they changed form, becoming indented at the margins, and then detaching rounded fragments, at first with pedicle. At last only minute bodies remained in the blood liquid, the largest being always smaller than unaltered blood-discs and the smallest quite minute granules. He found always small spherical blood-globules, the number of which varied according to the hour of the day, and the significance of which remains undetermined. In violent fevers, the blood-discs always have a tendency to become globular.

Rapidity of Nervè Action.—Haller attempted, in reading the Æneid aloud, to count the number of letters he could pronounce in a minute. Finding that he could pronounce 1.500, among which the R, according to his statement, requires ten successive contractions of the stylo-glossus, he affirms that a muscle can

contract and relax itself 15000 times in a minute; and as the time of relaxation is as long as that of contraction, each contraction requires about 1-30000 of a minute, or 1-500 of a second. From this Haller concludes that the nervous agent requires the 1-500 of a second to go from the brain to the stylo-glossus muscle. Following out this suggestion, Bois-Reymond has invented an ingenious instrument called a myographion, which registers the contraction of a muscle and the time intervening between that and the primary excitation of the nerve upon which the contraction depends. On applying this apparatus to the sciatic nerve and the gastrocnemius muscle of a frog, it was found that for two inches of nerve, contraction took place in the 1-450 of a second. Hence it is inferred that nerve-force is transmitted at the rate of 75 feet a second.

But does this really measure the rapidity of transmission of nerve-force? May it not as well represent the rate of contraction of muscular fibre, or perhaps a quantity composed of both these factors?

New Surgical Bandage for Fractures.—The starch apparatus has long been a favorite application to fractures. For starch as a thickening and solidifying material, M. Velpeau has recently suggested soluble glass. It possesses many advantages over anything else yet used for the purpose. It is rigid, affording a much stronger supporter than any of its predecessors, is easily applied, and very neat and clean, it hardens in two or three hours, and can be readily removed by softening with water in which it is soluble at any temperature. It is now quite generally used, both in Europe and this Country. In Baltimore it is extensively made of uniform composition, as one of the ingredients in the manufacture of artificial stone, and every one who desires to use it can easily obtain it at a moderate price, and of any consistence they may desire.

Marriage Between Blood Relations.—Dr. A. Voisin, Physician to the Bicetre Hospital in Paris, has contributed to the Memoirs of the Society of Authropology a memoir on this interesting subject, in which he takes opposite ground to that usually occupied by medical writers on this question. He

made his inquiries in the little French village of Batz, in which the whole populatlon is more or less related by ties of blood. Rejecting all but the intermarriages between persons nearly allied, he publishes the results of his inquiries with the results of 46 marriages, 5 between first, 31 between second, and 10 between fourth cousins. In these he finds none of the unhappy consequences so eloquently described by other writers. There were among the offspring of these marriages no malformations, no mental disorders, no idiocy, cretinism, albinism deafness, dumbness, nor epilepsy, Scrofula existed in but one young girl. Barrenness is almost unknown. Two only, third cousins, were childless, and the other 44 pair had 174 children, an average of about four to each couple.

The children were lively, cheerful, active and more than usually intelligent. The inhabitants of the village are usually long-lived, preserving to the end a good degree of bodily and mental vigour.

The conclusion he arrives at is that where no tendency to hereditary disease or morbid diathesis exists, the marriage of cousins does not deteriorate but rather improves the race.

In the Mariana Florida Courier, we find the following account of an apparatus constructed by Dr. T. W. Hentz of that place, for which he deserves great credit.

Mr. Milton Mosely of this county was wounded during the war in his face, carrying away his entire upper lip, and nearly his entire nose, his palate was cleft its whole length and all the front teeth carried away, making his appearance as unseemly as possible, and interfering with his speech and respiration, to such an extent as to be extremely annoying. Dr. Hentz made for him a palate and teeth, an india rubber nose, supported at its base by wires attached to the plate, and at its upper extremity by a pair of spectacles. Also attached a moustache to the upper lip, thus converting Mr. Mosely into quite a handsome man. His difficulty in speaking is removed, and the appliance, unless by close inspection cannot be distinguished from a natural nose and palate. This ingenious contrivance can be removed and put back at pleasure.

BOOK NOTICES.

Nature and Treatment of Decay of Teeth.—By R. Arthur, M. D., D. D. S.—Baltimore, John Murphy & Co., 1867. A monograph plain and practical, addressed to the public as well as to the profession, and therefore written in a style suited to the popular taste. It is the duty of the educated practitioner to instruct his patients, and without such a determination to instruct, he is unfaithful to his dignity as a member of a liberal profession. Our patients look for such service at the hands of educated men, and they are willing to receive it, if it be rendered with a generous sympathy and a courteous respect. Dr. Arthur has taken one of the various methods by which, in this age of advancement, we may impart knowledge. We make no comments upon its contents, as it will be thoroughly reviewed by Prof. H. R. Noel, in an article for our June number.

Messrs. Murphy & Co, have gotten the book up in admirable style. It is printed on good paper with clear type, and its wood cuts with few exceptions are excellent

Transactions of the American Dental Association.—Dr. L. D. Shepard, of Salem, Mass., Chairman of the Publishing Committee, announces that this work will be issued some time during the present month As it will contain the proceedings of the American Dental Convention from the first meeting to that of July, 1866, the work will be an interesting one to the dental profession.

Harris' Medical and Dental Dictionary, (*new edition,*) carefully revised and enlarged by Prof. F. J. S. Gorgas.—This work is now in the hands of the printer, and will be issued in a few months. Publishers, Lindsay & Blakiston, Philadelphia.

EDITORIAL DEPARTMENT.

Salutatory.—In again making our bow to our friends of the Dental profession, after so long a silence, it is natural to cast an eye backward over the past.

When this Journal first started into existence, Dentistry presented a vastly different aspect from what it does now. Then it was just struggling into existence as a liberal profession. Men of ability and position were found in its ranks, but they had not leavened the entire mass. It is not to be disputed that the majority of practitioners of the art of Dentistry at that time had no claim to be considered members of a liberal profession. The men who under

took the care of their neighbour's teeth were often very ill prepared for any study. The blacksmith of the village added dentistry to his other avocations, and even in cities, ingenious mechanics out of employment sought the practice of this art, as a convenient refuge from starvation.

The opportunities for these aspirants to gain any general knowledge of dental theory or art was exceedingly small. The student must enter the office of some dentist already engaged in business, and not better informed than his junior who was seeking for information. There he saw practice and hardened into all his master's errors. The art consisted of a collection of secrets which were jealously guarded in proportion to their inefficiency. Indeed there was an isolation among dentists more complete than any that existed among the different handicrafts. Under such a combination of unfortunate circumstances, it was simply impossible that a profession could exist.

Now, however, what do we see? The Dentists, as a profession, are recognized as Medical Specialists, just as much so as oculists and aurists. Socially they are gentlemen; professionally they command respect. They have a copious and creditable literature. They have pressed into their service the other sciences. Chemistry, Physiology, Pathology, Microscopy, Anatomy all contribute to this progress, and aid in the establishment of Dentistry on a sure foundation.

If we ask ourselves how this very desirable end has been brought about, we shall find that it has been due to a combination of causes. In the first place, the Colleges have contributed very largely to this result.. They have, following the lead of the Baltimore College of Dental Surgery, taken instruction out of the hands of the office-practitioners. They have banished nostrums and secret practices, and have thrown open all the acquired knowledge in the possession of practitioners. They have trained a succession of students, year after year, in those studies which make up a liberal professional education. They have secured the services of men eminent in Medicine to teach their specialties, and have carried the study of these as far as is requisite for the most thorough training of the dentist. They have cultivated an *esprit de corps* and instilled into the minds of the pupils an abhorrence of the low arts and vulgar secrecy of the charlatan.

Nor can we who control the oldest periodical in the world devoted to the propagation of the principles upon which Dental Surgery is founded, forget the services rendered by the Journals. They have furnished continually, a medium by which members of the profession could communicate their ideas to their fellows. In this manner, information has been diffused and the habit of imparting it has been cultivated. Doubtless in these, as in all other Journals, literary, political or scientific, many worthless speculations have been published, but they have not been by any means destitute of valuable contributions to science both general and special. Thus Dentists have become known to each other all over the world; a current literature has been established, and the professional feeling generated by the Colleges has been fostered and strengthened. Need we say that, in the future, as in the past, we shall carefully cherish this *esprit de corps*.

There is still another agency which is too often overlooked, but which has

been by no means inefficient in developing the resources of the profession. We allude to the Dental Depots. It is true they are commercial establishments, and their main object, as of all other trading concerns, is to make money for their owners. But what legitimate and honorable business ever failed to promote the general good? Every mercantile house created in a city is a new element of prosperity to the whole community. It brings business which employs many of the inhabitants. It introduces capital and increases the general wealth.

In the Dental Depot, we recognize more than this. It is a special and active agent in the improvement of the profession. The stimulus of competition induces each Depot to vie with its fellows in bringing out and laying before the profession, all new instruments and appliances of the art. The operator may there see at a glance the most recent improvements and suggestions. By this means a speedy trial is secured for any new proposition and it soon finds its proper level, by general adoption, if useful, by early rejection if valueless.

We have said nothing of Societies, because their action greatly resembles that of the Journals. They furnish a medium of communication, and accomplish generally the same ends as the periodicals, through which they make known their transactions.

Association of Dental Colleges.—We wish to call the attention of our readers especially to the proceedings of the Association of Dental Colleges—in our judgement the most important subject in Dentistry that can engage the mind of the reader or employ the pen of the journalist. We confess to a feeling of disappointment that the Editors of so widely circulated a journal as the *Cosmos*, should have passed over, without notice certain minutes in those proceedings which record an action that must have a decided influence upon Dental Education.

That one of the Colleges represented in that Association—and one of the most influential—should have refused to co-operate with the others in their effort to improve the system of education; still further that it should have determined to pursue a course which the others regard injurious to the cause of Collegiate Education—is a matter of gravest importance. It challenges the censure or approval of the Profession, and is a subject which must necessarily be discussed. Our pages will be open to any communications, on either side of the question, which shall be written with fairness and courtesy. As Editors we cannot permit any exclusion from our journal of temperate discussion of a subject so important as Dental Education. But as friends of education, and Professors in a Dental College, we think it our duty to record our disapproval of the *Secession* of the Pennsylvania College.

Rubber, or Coffer Dam, Barnums.'—From the experience we have had in the use of this simple appliance, as a protection against saliva during the operation of filling certain cavities in the teeth, the approximal for example, we feel disposed to recommend its use to those who have not yet given it a trial. This appliance consists of nothing more than a thin sheet of India-rubber of good quality, that it may not tear easily, and of a thickness double that of letter paper.

The sheet of rubber is cut from four to eight inches square, and near its centre one, two or more holes are made, through which one or more of the crowns of the teeth are passed, when it is applied to the mouth. The holes should be much smaller in diameter than the necks of the teeth they are to embrace; it has been recommended to make them one tenth smaller. and to have several holes in the sheet in order that one or more teeth on either side of the one to be filled, may be included; also, when the teeth approximate closely, to have the holes one eighth of an inch apart, and a greater distance if there is more space between the teeth. The holes should be cut perfectly round, in order that their margins may embrace the necks of the teeth closely, and also to prevent their tearing when dilated. To cut the holes perfectly, some stretch the rubber over a pointed piece of wood which is then cut off with scissors: but a better plan for securing a perfectly round, clean cut hole is to use a small punch with a chisel edge. To carry the rubber thus prepared, between the teeth, waxed floss silk, or a thin flat burnisher may be used, and the margin of the hole pressed gently under the free edge of the gum in the direction of the root of the tooth. Where care is taken in removing the rubber from the teeth, the same sheet will answer for many operations. It is also economical to make the holes in the rubber sheet near to one of the sides, instead of near the centre, and should rupture of the margins occur, this part of the sheet can be cut away, and the remaining portion used again. As the odor of the rubber may be unpleasant, especially when it is applied to the front teeth, this effect may be obviated by the use of a perfume bag around which the sheet may be wrapped when not in use.

Cohesive Shred Gold, Lamms'.—After several month suse of this preparation of gold, we are disposed to regard it with some favor. Under manipulation, it apparently becomes very dense, and the facility with which it can be used renders it somewhat preferable to crystal or sponge gold. Sufficient time, however, has not elapsed since we commenced the use of it, to enable us to form a correct opinion in regard to its durability, &c.

It certainly does possess great cohesiveness, and when the same care is taken in introducing and condensing it, that is necessary in the use of adhesive foil, there is good reason to believe that a reliable filling may be made of this material.

Its inventor claims for it unequalled softness, cohesiveness and density, and asserts that it condenses and unites *perfectly under fluids*. While we are very willing to bear testimony as to its softness, cohesiveness and density, when introduced in a dry condition, and, from experiments made, of its uniting, in a measure at least, under fluids, yet we do not believe that a *perfect filling* of this, or any other material, can be introduced in a wet condition, not even of "Amalgam." In the centre of several of the blocks of this preparation we have found hard masses, totally unfit for use, and while we are aware of the difficulty of producing in every portion manufactured of this, or of crystal or sponge gold, a perfectly uniform material, yet we think this defect might be remedied if a careful examination was made, and perfect material only be exposed for sale. In using this form of gold, small pieces, from one-half to

two-thirds the size of the cavity to be filled, are torn from the block with a fine, sharp pointed instrument, and carried to the position desired, either on the point of the instrument, or by means of small introducing plyers, taking care that the fibres of the gold are not compressed in the handling of it.

The first piece introduced should be firmly fixed, well condensed, and upon this, which serves as a base, the remainder of the filling is built. The manner of introducing and condensing the cohesive shred gold is similar to that of the crystal or sponge gold, care being taken to condense it well against the walls of the cavity. The instruments, however, differ from those used for crystal or sponge gold, their points are not so small, nor so deeply serrated. It is recommended to use tolerably blunt instruments with shallow serrations, somewhat similar, as regards the condensing points, to the ordinary condensers for non-adhesive gold foil.

Origin of Petroleum.—Berthelot, who has recently been working out the synthesis of hydrocarbons, has suggested a new theory to settle the puzzling question of the origin of petroleum. He has succeeded in forming a cetylene, a very rich hydrocarbon, (C_4, H_2,) by direct synthesis of its elements, and by a simple process in obtaining from it ethylene or olefiant gas. Without going into minute details, suffice it to say that acetylides are always formed when carbonic acid comes in contact with the alkaline metals at a high temperature. Now we know that the earth is everywhere impregnated with carbonic acid, and Danbree has recently shown good reason for believing that the terrestial mass contains melted alkaline metals in the interior. As earthy carbonates produce the same reactions with alkaline metals, we have all the conditions necessary for the generation of acetylides by simple mineral reactions. Now if these acetylides could be subjected to the action of steam, they would be decomposed and pure acetylene given off, if they could be cooled off and removed from the influence of hydrogen. But, as this cannot be, bitumen and tars are produced by the perpetual reaction of hydrogen, and at one of the stages, these reactions are capable of producing a series like the American petroleum.

Thus, we need not look for a quantity of vegetable matter, and a subterranean distilling apparatus and long undiscoverable streams leading to deep reservoirs, but can account for the phenomena by reactions which must needs be universal under the entire crust of the earth, so that petroleum may be found anywhere, if we bore deep enough.

Sewing Machines.—Dr. Down, of the Redhill asylum for Idiots, has recently read a paper upon the detrimental action of these machines upon the health of those who habitually use them. At his hospital in London, his patients who had been constantly employed in working sewing machines, suffered from pallor, lassitude, pain in the back and leucorrhea. Some of them became conscious of the injury they were receiving from observation of their own symptoms, and abandoned an occupation manifestly detrimental. These ill effects attend the use of the large, heavy machines worked with both feet. The lighter apparatus worked by a single treadle is not so injurious.

North Carolina Dental Association.—It is gratifying to note that our friends in North Carolina are endeavoring, by well directed efforts, to elevate the standard of the profession in their State.

We are also pleased to see that the graduates of the Baltimore College of Dental Surgery are at the head of this movement No less than six out of the nine officers of the Association being graduates of the Baltimore College. They propose to have a law passed by the Legislature which requires every one who commences dental practice in the State after a specified time, to be a graduate of a dental college, and that those who have been in practice prior to the time named, be required to submit to an examination by a regularly appointed board of the State Dental Society.

Virginia Dental Society.—A short time since we received from the Secretary, Dr. W. Leigh Burton, a copy of the Constitution and By-Laws of this Society, whose object is " to cultivate the Science and Art of Dentistry, and all its collateral branches : to elevate and sustain the profession and character of Dentists : and to promote amongst them improvement, social intercourse and good will." Article IX. of the By-Laws prohibits any member of the Society from taking an office student for a less term than two years; "and he be advised by his preceptor to attend and graduate at a Dental College." This is a praiseworthy effort, and our friends in Virginia have our best wishes for the success of their efforts to elevate the professional standard.

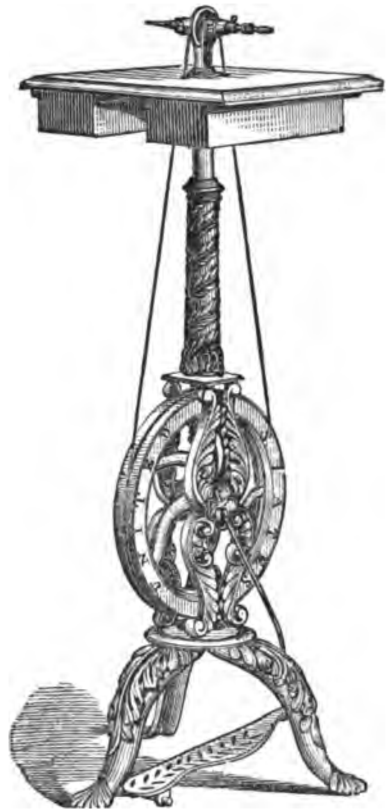
A Word of Explanation.—Our readers will notice the absence of Selected Articles in this number. We had several interesting papers marked for our selected department, but they were crowded out by the quantity of original articles kindly placed at our disposal by our friends. We also apologize to those of our contributors whose papers have been left out for want of room. They shall appear at the earliest possible date.

Obituary.—Dr. John S. Clark, formerly of New Orleans, died on the 29th of November, 1866, at his residence in St. Louis, where he had been in practice for several years. Dr. Clark fully illustrated the rare combination of high moral and social virtues with eminent professional acquirements. No higher evidence could be afforded of his professional and social standing than is expressed in the appropriate resolutions passed by the Dentists of St. Louis, at a meeting called upon the announcement of his death.

We have also to announce the death of Dr. A. M. Leslie, formerly of Cincinnati, whose name is familiar to our readers from his connection with the Miss. Valley Dental Depot. His thorough knowledge of the wants of his professional brethren rendered him peculiarly qualified for the calling in which he had been engaged for a number of years past, in Cincinnati, St. Louis, and Memphis.

John R. McCurdy, Esq., whose name is also familiar to the dental profession, from his connection with the old firm of Jones, White & McCurdy, died n Philadelphia, in February last.

UNITED STATES LATHE.



We offer the Dentist a most complete FOOT LATHE for grinding teeth, and polishing plates.

It has been gotten up in a superior manner, great care having been taken to make it durable and efficient. It has a moveable column and table, which is capable of being elevated eight inches, to accommodate the operator in either a sitting or standing posture.

It can be packed in a box, sixteen inches square, and can be set up in a few minutes, presenting a very neat and pleasing appearance, suitable for the office or laboratory. It is finished in bronze, and runs very light and steady.

Price of Lathe with short spindle..$22 00
Price of Lathe with long spindle.. 23 00

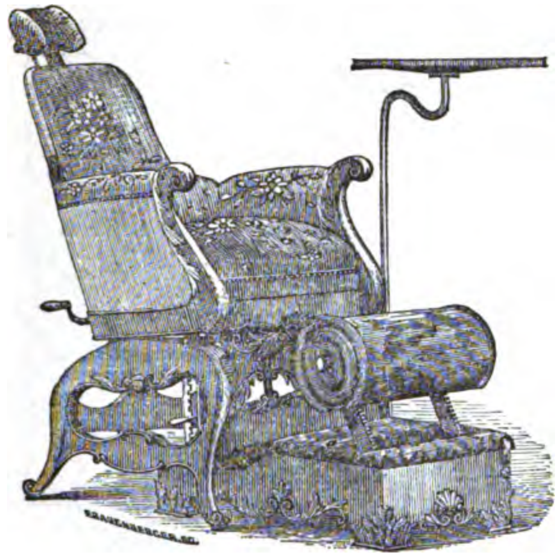
TABLE HEADS.

This is on the plan of the U. S. Lathe head, adapted to any table. A socket screws to the table, which has a set screw in the lower part, the head slides four inches to tighten the strap or vary the height from the table.

PRICE..$12 00
U. S. Lathe head without socket.. 10 00
Head as per cut on Locomotive Lathe.. 8 00

JUSTI & CO.

ARCHER'S IMPROVED DENTAL CHAIR.



PRICE LIST OF CHAIRS.

No. 00—Is made of Walnut or Cherry, and upholstered in good style, with a moveable head-piece like the best chairs, but with a stationary seat and back. Covered with plush. PRICE $32. Covered with enameled cloth, PRICE $27.

No. 0—Is made of Walnut or Cherry, and upholstered in good style, with a moveable head-piece and falling back, (on the same principle as the one shown in the engraving,) but with a stationary seat. Covered with plush, Price $15. Covered with enameled cloth, PRICE $40.

No. 1—Is made of Walnut or Cherry, and upholstered in good style, and with all the movements complete. It is covered with reps or enameled cloth, PRICE $50.

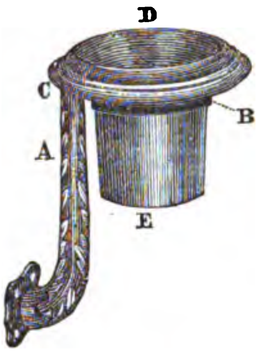
No. 2—Is a very handsome Black Walnut or Mahogany, or imitation Rosewood frame, with all the movements like the chair shown in the cut. It is made with flaring arms, making the seat wide enough for the convenience of any patient. The price of this chair is unusually low for one so well finished in every respect. We sell more of this chair than all the others combined. PRICE WALNUT, OAK, (or imitation Rosewood,) $60. MAHOGANY, $63. And with swan neck arms instead of plain arms, $1 extra.

No. 3—Is made of the best quality of Black Walnut or Mahogany, and splendidly carved and covered with the best quality of Moquette or plush. It has flaring arms, carved in imitation of a swan's neck and head, making a very handsome chair. Price of either Walnut or Mahogany, $90.

No. 4—Is made of solid Rosewood splendidly carved, upholstered in the very best manner and covered with the best quality of plush, inside and outside alike, and with or without silver headed nails. The seat is raised by means of a silver-plated wheel instead of crank, and the brass work is silver-plated. It is in all respects the most elegant chair in use. PRICE $125. Mahogany ar Walnut, same style and finish, $110,

Any of the above chairs, (except No. 4,) upholstored with silver nails, $2 extra.

JUSTI & CO.



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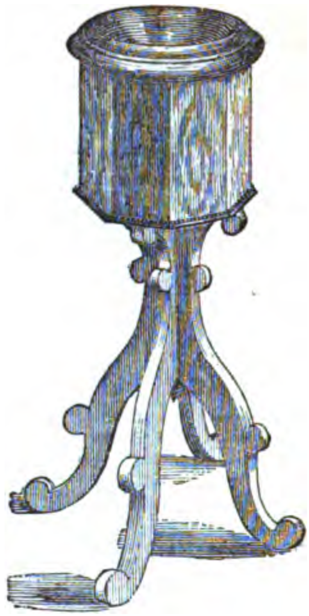

No. 2.

SPITTONS.

No. 1.—"A" is the standard to be attached to the lower part of the chair which remains firm when the upper part of the chair is thrown back. "B" is the ring attached by a strong bolt to the top of the standard on which it can be moved so as to throw the spittoon either towards the front or the back of the chair. "C" is the marble top. "D" the glass funnel, and "E" the bowl with which the funnel can be readily removed to be cleansed. The iron work is handsomely bronzed, and in every respect is very ornamental and very durable and convenient. PRICE $8.

No. 2—Is made of Mahogany or Walnut, or imitation Rosewood, with marble top and heavy claret colored glass funnel and inside bowl complete. The bowl lifts out from the top the same as number one. PRICE $11. The same of Rosewood, $13.

Heavy claret-colored glass spittoon funnels One Dollar each.

FOOT STOOLS.

The foot stool (as shown in the cut) is acknowledged by all to be the most convenient of any in use. It raises and lowers to suit the rise and fall of the seat.

No. 1.—Plain Walnut, covered with Ingrain carpet. PRICE $11.

No. 2.—Made of Mahogany or Walnut, or imitation Rosewood, covered with Brussels carpet. PRICE $13.

No. 3.—Made of Mahogany or Walnut, handsomely carved and covered with Velvet carpet. PRICE $20.

No. 4.—Rosewood handsomely carved and covered with the best Velvet carpet. PRICE $25.

JUSTI & CO.

PRICES OF TEETH.

Gum teeth	per tooth,	23 cts.
Plain "	"	12½ "
Pivot "	"	8 "

The following discount will be allowed when teeth are purchased in quantities:

$25 or more	10 per cent.
50 "	15 "
75 "	20 "
100 "	25 "

GOLD FOILS, &c., for Filling.

T. G. Armstrong & Son's fine Gold Foil	per oz.	$44 00
David Morgan's	"	44 00
Charles Abbey & Son's	"	48 00

David Morgan's Cohesive Shred Gold, an article pronounced by all who have used it as very superior, in the qualities of cohesiveness and softness under manipulation, saving of time and the peculiar facility with which it can be condensed under fluids.....price per ⅛ oz. $6 00

Watts' Crystal or Sponge Gold	No. 2, per oz.	50 00
Tin Foil, superior	per book	50
Tin Foil	"	38

AMALGAMS.

T. G. Armstrong & Sons	per oz.	$2 00
Townsend's	"	2 00
Lawrences'	"	3 00

Hill's Stopping	per oz.	$5 00
Robert's Os-Artificial	per box,	1 00
Artificial Dentine	"	3 00
" "	per single cake,	1 00

Gold and Silver Plate, Solder, Wire and Springs, Platina Gold for Clasps, French Platina Plate and Wire.

Platina Scraps, made into Plate.....per oz. $1 00

DENTAL FURNITURE,

Comprising Chairs, Footstools, Spittoons, Instrument Stands, Extension Brackets, Cabinet Cases, etc.

Archer's Chairs	from $40 00	to $125 00
" Footstools	" 11 00	" 25 00
" Extension Brackets	" 12 00	" 17 00
Instrument Stands	" 5 00	" 16 00
Spittoons	" 8 00	" 20 00
Cabinet Cases	" 40 00	" 85 00

Also, Butler's, Salmon's and other Chairs, Spittoons, &c., new and second-hand.

DENTAL LATHES.

United States Lathe complete	$22 00
Chevalier's Standard	18 00
Amateur's Lathe for Polishing, Turning and Drilling, very complete	35 00
Lodge's Lathe, strong iron frame with shears, movable head chucks, &c.	60 00
Empire Lathe, a splendid article	40 00

T. G. ARMSTRONG & SON.

LATHES.

Hand and Foot Lathe..$10 00
Hand Lathe, two spindles.. 6 50
" " one " 5 50
" " two " enclosed wheel.. 6 00
" " two " " " 4 00
" " skeleton.. 2 50

DENTAL INSTRUMENTS.

A very large assortment of Dental Instruments of the standard makes, including Chevaliers', Kern, Gemrig and others, comprising Forceps of nearly one hundred different patterns, Stump Elevators, Screws, Hooks and Punches, ebony and ivory handles, Lancets, Plugging Instruments, Scalers, Excavators, Burs, Drills, etc., etc.

DENTAL CASES.

No 1.

5 Drawers, 2 Trays, Pearl or Cameo-handles Gold Ferruled Instruments, Hand Mirror, Mouth Glasses, Foil Shears and Gum Lancet, all pearl handles and gold mounted; extra quality Octagon Joints Forceps, and all the other instruments, in very superior styles and finish. Complete..$200 00

As above, but plainer Instruments..$175 00

No 2.

Fine Rosewood Case, with drawer for Forceps, and tray divided into compartments for Foil Files, Teeth, &c. Same styles of Instruments described above, $150 00

No. 3.

Fine Rosewood Case, Instruments as above..$125 00

No. 4.

Rosewood Case, Instruments ivory handles and silver ferruled, pearl works, silver mounted..$100 00

No. 5.

Brass Bound Mahogany Case, fluted handled instruments, pearl work, silver mounted..$65 00

No. 7.

Brass bound Mahogany Case, with two trays. Complete with Instrument, $50 00

No. 8.

Same as No. 7..$40 00

No. 9.

Brass bound Mahogany Case, one tray..$30 00

No. 10.

Neat Mahogany Case, contains—
6 bone handle Scalers, no ferules.
12 steel " Pluggers.
1 Gum Lancet.
1 Mouth Glass.
1 Socket Handle.
2 doz. Drills and Excavators to fit Socket.
1 pair upper molar Forceps.
1 " lower " "
1 " straight.
1 " roots.
2 Elevators..$20 00

T. G. ARMSTRONG & SON.

DENTAL SYRINGES.

Gold	$15 00
Gilt	6 00
Silver	5 00
" Plated	3 50
Gutta Percha ......75 cts. to	1 00
White Metal Silver Point	75
Glass	25

Salmond's Improved Automatic Mallet.

PRICE REDUCED.

The smallest, neatest and most perfect substitute for the mallet in use, combining the advantages of hand pressure and concussion, and obviating the necessity of an assistant.

PRICES.

French goat skin case Mallet, Rack and 30 Points	$26 00
" " " " 24 "	23 00
" " " " 6 "	12 00
Mallet in paper box	10 00
" triple gilt	14 00
Points per dozen	3 50

Points of any desirable shape furnished to order.

FOOTE'S AUTOMATIC MALLET.

Mallet, 1 point	$10 00
Rack and Case	4 50
Twenty Points	5 50
Case Complete, twenty points	20 00
Mallet, Triple Gilt	14 00
Points per dozen	3 50

PLUGGING MALLETS.

Large supply of these instruments, varying in price from.........38 cts. to $1 25

FILES.

MURPHY'S, EARNEST'S AND OTHERS'
STUBBS' AND FROIDS', imported.
Plate and rubber files.

ROLLING CASES FOR INSTRUMENTS.

With from 5 spaces to 16 spaces.........$1 00 to 3 00

PEARL GOODS.

INSTRUMENTS AND MIRRORS,

A Splendid Variety.

HAND MIRRORS.

Mahogany, French Plate Glass, 4½ inch	$ 75
" " " 5 "	85
" " " 5½ "	1 00
" " " 6 "	1 25

T. G. ARMSTRONG & SON.

GAS APPARATUS.

We keep on hand a full supply of Gasometers and all the popular apparatus for making and administering the Nitrous Oxide Gas, with latest improvements in Inhaling Tubes, &c., &c.

Ether Spray or Rhigolene Instruments,

FOR PRODUCING LOCAL ANÆSTHESIA,

With Double Tubes, several varieties, price	$6 00
Rigoline, per pint bottle	1 00

BRUSH WHEELS.

Cotton or Buff Wheels	from 15 cts. to $1 00
Brush Wheels	" 15 " 1 00
Felt Wheels for finishing Rubber	" 15 " 50

N. B.—Please state in ordering Wheels, number of rows of bristles in width, diameter, shape, and whether hard or soft are required.

ARKANSAS, WASHITA AND SCOTCH STONES,

All shapes and sizes, from	25 cts. to $3 00

PLASTER OF PARIS.

EXPRESSLY FOR DENTAL PURPOSES.

Per quart	$ 08
" barrel	4 75

CORRUNDUM WHEELS.

Corrundum Wheels, from	6 cts. to $1 00
" Cones for Lathe	12
" Files, Round, Taper and Flat Oval	25
" Slabs	38
" Tape, per piece	8
Buck Horn Tape "	8

TOOTH POWDER BOXES.

Paper, fancy colors and gilt, tin foil lined per doz	$ 50
Wood, varnished, "	50
Glass, with Metallic Lids	1 50
" " Glass Lids	1 75

BLOW PIPES.

Condensing Blow Pipe	$25 00
Self-acting "	6 00
" "	4 00
Brass, Screw Joint, "	1 00
" with bulb "	85
" heavy 11 inch "	50
" " 13 " "	55
" " 15 " "	60
" " 9 " "	20

T. G. ARMSTRONG & SON.

OUR NUMBER.

There are TWO houses numbered 82, on West Fayette st., one EAST of Charles st. is occupied by a Merchant Tailor, the other, WEST of Charles st., we occupy.

DENTAL MACHINERY

OF OUR OWN DESIGN.

We manufacture the following Dental Machinery, which can be had at all the Depots.

Amateur Lathe	$35 00
Locomotive Lathe, (new)	25 00
United States " Long spindle	23 00
" " " Short "	22 00
Heel and Toe " (new)	20 00
Hand "	4 50
Hand and foot	10 00
Diamond Table Head, brass, polished	12 50
United States Socket Table Head	12 00
Plain Table Head	8 00
Diamond Fly Wheel	12 50

FLY WHEELS,

FROM 8 INCHES TO 18 INCHES IN DIAMETER, AND FROM 12 TO 50 LBS.

SNOWDEN & COWMAN.

PORCELAIN TEETH.

We have, and will keep on hand, a large assortment of teeth of the following munufacturers, which we sell at their prices, and when bought in quantities we allow the same discount as the maufacturer.

S. S. WHITE, JUSTI & CO.,
ARMSTRONG & SON, JOHNSON & LUND.
PHILADELPHIA MANUFACTURING CO.

Our assortment embraces every variety of style, shade and make of

TEETH.

SNOWDEN & COWMAN.

NEW BOOK.

ARTHUR ON "DECAY OF THE TEETH." $1 00.

Trade supplied.

SNOWDEN & COWMAN.

VULCANIZERS.

No. 1 Vulcanizer.

This Vulcanizer is made of very heavy copper and thick brass top. It will bear four times the pressure required. Can be closed or opened in a minute, hot or cold, it is tinned inside to prevent the action of the sulphur on the copper; is adapted to any flasks in the market. Will hold two flasks of our old style or three of any other make. Heated by gas or kerosene oil. PRICE $20 00.

No. 2 Vulcanizer.

With flat brass top, tinned inside; will take any flask except our old style flasks and is equal in strength or durability to any Vulcanizer in the market. It will bear twice the pressure required. PRICE $16 25.

THERMOMETER.

Especial pains has been taken with the thermometers to have them accurate, and if broken they are easily repaired. PRICE $2 00.

2 Flasks, iron, 87½ cts. each	$1 75	Jacket	$ 30
Wrench	10	Alcohol Lamp	2 50
Gas or Kerosene Stove	2 50	Thermometer tubes & scales, each	1 00

Gasometer for holding and preserving the gas any length of time.

We are manufacturing gasometers of three sizes, of a very convenient form. They are made of zinc, in the best manner, with iron pipes, inside, and iron gallows to support the gas holder—the gas holder is readily taken down or put up. A No. 1 Gasometer, 30 gallons, occupies a box 30 x 24 inches. They look well in the operating room, or can be put up in any other room more suitable, as they are neatly painted and bronzed.

A MOUTH PIECE OR BREATHING TUBE.

is a hard rubber stop-cock with two valves, one for inhaling the gas, the other for breathing into the air. The several parts are connected by rubber pipes.

PRICE OF THE APPARATUS COMPLETE.

No. 1 holds 30 gallons	$45 00
No. 2 holds 40 gallons	50 00
No. 3 holds 50 gallons	55 00

No charge for boxing.

NIT. AMMONIA.

10 pounds, in Jars	$7 00
20 pounds, in Jars	14 00
Per pound	75

RETORTS.

Glass Retorts, per doz	$6 00
Glass Retorts, each	60

Boxing extra.

SNOWDEN & COWMAN.

FLASK PRESS.

This Press is intended to close the flask together after packing with rubber, thereby saving the screws of the flask—it is of great advantage, saving screws and flasks. PRICE $2 00.

PORTABLE HEAD REST.

This head rest can be attached to any chair—can be packed in a small space and is very simple and light. PRICE $6 25 each.

SPRAY APPARATUS for producing Local Anæthesia.

Apparatus with one bifurcated double jet straight tube	$6 00
Apparatus with two curved double jet tubes instead of straight	9 00
Apparatus with one single jet tube, for surgeons use	5 00
Price of double jet tubes, each	3 00
Price of single jet tubes, each	2 00
Rhigolene, best quality, per 12 oz. bottles	1 00
Concentrated Sulphuric Ether, 1 lb bottles	2 00

AUSTEN'S MOULDING RINGS

Consists of four rings in a nest, requiring but little sand. Price 75 cts. per nest.

SNOWDEN & COWMAN.

OFFICE CABINET.

Mahogany or Walnut Cabinet Cases of any design or finish, having drawers for instruments, foil, napkins, &c. The top closes and locks, as also the lower drawers. PRICE $50 00 to $80 00.

SPITTOONS.

Mahogany or Walnut, octagon marble top, drops pending from each corner of the body, a turned octagon and fluted pillar, with scrolled and moulded feet on rollers. PRICE $20 00.

SNOWDEN & COWMAN.

DR. WELCH'S NERVE PASTE.

This preparation is very certain in its action on the nerve, destroying it in less than twenty-four hours. It has the advantage of not causing pain or producing inflammation, with very rare exceptions. Also, it may be used with safety in cases of toothache that proceeds from exposed nerve, and seldom fails to give relief in from five to twenty minutes.

DIRECTIONS.—Place a portion of the size of a pin's head in IMMEDIATE CONTACT with the exposed nerves, covering it carefully with wax, allowing it to remain twenty-four hours. A very minute portion placed in a cavity, in preparation for filling, will destroy its sensibility in four to six hours. The bottle contains sufficient for two hundred applications.

N. B.—If the paste should become dry, moisten it with creosote or warm it until it is quite soft.

☞ If after twenty-five applications, it does not give satisfaction, return the Nerve Paste and we will return the price. PRICE $1 00 per vial.

DR. WELCH'S AMALGAM.

This is a new recipe, and we claim for it a superiority over any other now in use. It has a large proportion of the noble metals, giving this amalgam the requirements of a good filling. PRICE $3 50 per oz.

DENTAL CHAIRS.

We are manufacturing a handsome DENTAL CHAIR, that has no superior in the market for the price. It is made of walnut, upholstered in fine plush, with plated nails, silver plated head rest, and has all the movements. This chair has been very much admired and gives entire satisfaction.

Price	$90 00
" In rept	80 00
Iron head rest bronzed	10 00 less.

FOOTSTOOLS.

With cylinder to raise and lower, covered with Brussels carpet, price	$15 00
Covered with ingrain carpet	13 50
A very neat footstool, with step covered with Brussels carpet	10 00

We call attention to the

ADVERTISEMENTS OF

S. S. WHITE.
BALTIMORE DENTAL COLLEGE.
FRANCIS ARNOLD.
CHARLES ABBEY & SONS.
ROBERTS' OS. ARTIFICIAL.
H. D. JUSTI & CO.
T. G. ARMSTRONG & SON.
SNOWDEN & COWMAN.
DR. E. C. PRICE.

THE

AMERICAN JOURNAL

OF

DENTAL SCIENCE

Will be conducted on the most liberal terms for the benefit of the DENTAL PROFESSION, and all who are connected with it.

We therefore solicit the assistance of the DENTAL DEPOTS, to make it a Journal worthy of its name and of its former prestige, and we hope they will identify themselves with it by obtaining subscriptions and contributions; also advertising in it to such an extent, as will show that it is not issued for the interest of any establishment, but for the mutual benefit of the whole.

As the Journal will have a circulation throughout the United States and the British Provinces, it will be a valuable medium for advertisements.

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SNOWDEN & COWMAN,

PUBLISHERS OF THE

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TO READERS AND CORRESPONDENTS.

Communications intended for publication, and exchange journals and papers, should be addressed to the EDITORS OF THE JOURNAL, Baltimore, Md. All letters relating to the business of the Journal, or containing cash remittances, to be directed to Messrs. SNOWDEN & COWMAN. Articles for publication should be received by the editors at least three weeks previous to the first day of the month on which the number in which it is designed for them to appear, is issued.

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THE

AMERICAN JOURNAL

OF

DENTAL SCIENCE.

Vol. I. THIRD SERIES.—JUNE, 1867. No. 2.

ORIGINAL COMMUNICATIONS.

ARTICLE I.

The Aim, Power and Instruments of Dental Education, No. 1.

By Professor AUSTEN.

I PROPOSE to consider in these papers a subject to which every thoughtful dentist, who loves his profession, must give a very earnest consideration. None can put it from them by saying that it is no concern of theirs, but a matter for magazines and colleges. Every dentist, the most illiterate equally with the finest scholar; the most social and communicative not more than the reserved and exclusive—all are alike raised or lowered by whatever promotes or retards professional improvement; and among the agencies operating thereon, none are comparable in power with education.

In assuming for EDUCATION the first place among such agencies, I must be understood as using the word in its highest sense. *Instruction* may be considered according to either of the several modifications of the original signification of the Latin word: 1—to set in order, or arrange; 2—to construct, or build; 3—to prepare, furnish or equip.

In each of these primary meanings, we find elements of that secondary signification, which in the English language is its only one. For it is the duty of the instructor to "set in order and arrange" the knowledge which he imparts; "to construct or build" according to correct rules, the system, science or art which he teaches; "to prepare, furnish or equip" the mind and hand of his pupil.

Instruction, however, is not all of education. It defines the duty of the teacher; but in the word *education*, we find implied the corresponding duty of the student. This word is also of Latin origin, and to learn its true significance we must refer to its primary meaning. When Cicero says "educate (draw out) the sword from the scabbard," and Virgil says "educate (draw out) the weapon from the body," the literal translation sounds strangely, because in English the secondary meaning has supplanted the primary one. Yet when we say "educate (draw out) the mind," we find the meaning of Cicero and Virgil underlaying and giving force to the English word. The most complete instruction avails as little as the sword in its scabbard, unless the student will unite with the teacher in acquiring the ability to draw and wield it.

Education therefore differs essentially from instruction in this—whereas instruction does not necessarily require more from the student than diligence, attention and memory, his education is impossible, unless he will earnestly co-operate with his preceptor in the effort to "draw out," cultivate, quicken, enlarge, strengthen, develope and improve his mental and physical powers. Education gives the power to use and apply instruction.

It is clear that education is a Partnership, in which either party has the power to aid or to hinder, or even to neutralize the work of the other. Hence all schemes of education, and all theories as to its effect upon any given profession will fail, unless we have regard not only to the methods of teaching, but also to the character of those

taught. So far from questioning the importance of correct instruction, it will be the special object of these papers to inquire into the best means of perfecting the same. But it should be distinctly understood and emphatically stated that, whilst laborious instruction "may put into" a dull mind much knowledge, no amount of education can "draw out of" him what does not exist.

If then, a profession looks to any educational system for its elevation, it must be remembered that quite as much depends upon the material furnished as upon the manner of its treatment. The training of asses cannot shorten their ears nor make musical their discordant bray; neither will many series of generations, by any law of transmutation of species, convert them into war horses. In justice to our methods of instruction, the imperfections of which are freely admitted, we must state plainly what is the duty of the dental profession in this important respect of selecting the material out of which the next professional generation is to be formed.

In every profession, exceptional men stand above it. They do it honour and help to elevate it, but cannot possibly raise it to their level. Again, exceptional men stand below and help to degrade. But the profession itself takes the level of its majority. Socially, it is refined or vulgar; intellectually, it is cultivated or ignorant; professionally, it is experienced or incompetent, according to the character of the majority. Hence we find an infinite variety in the local estimation of a given profession, dependent upon its average character in that locality. I have spoken of position, social intellectual and professional. Much foolish talk on the subject of the status of the dental profession arises from confounding these distinctions, owing in great part to the failure to distinguish between professional and personal character.

The distinctions and exclusions of social caste are not proper subjects of professional inquiry, and form no part of professional ambition. We should not consent to take our

standing according to rules which can permit an abandoned roué to take precedence of Michael Faraday, or a corrupt politician to be more sought after than Sir Benjamin Brodie. Still, an honorable position in society is desired by all, and this every man may make for himself by virtue of his *individual* character. There are social circles which rigidly exclude certain professions; but this ban will not prevent any one from enjoying the high esteem of his fellow-men, if he shall choose to deserve it.

The honours awarded to intellect are more justly and less capriciously given. They are within the reach of every professional man who will work for them. It is worse than folly for any set of men to complain that the world does not rate them equal intellectually to some other set. It is the meanest kind of mental agrarianism; the idle and poor, clamorous for that wealth of reputation, which has been earned by genius and cultivated talent. When most surgeons were barbers, there was here and there an Ambrose Parè, but as a class they were not educated men. In spite of Celsus, Galen, Sydenham and Harvey, the medical profession in olden times took the intellectual and social rank of its majority, and this was by no means high. Two centuries of high mental culture and profound study of professional and collateral science filled the ranks of medicine and surgery with names that compelled the admiration of the world. The profession then took the rank of its majority, and the name of physician or surgeon, so far from a reproach, became a presumption of merit.

But how is it now? This hard-earned position has to struggle under a fearful weight of mediocrity and worse than mediocrity. And this because of the wide-spread perversion of the purpose and methods of medical education: because the refuse of our youth are permitted to pass through medical schools: because a young man who is too bad for the pulpit, too dull for the bar, too lazy for the store, and too ignorant for any other business or profession

is thought quite equal to the *study* of medicine; and because so many medical schools pronounce him quite equal also to the *practice* of it. A few more years of persistence in this course will make men ashamed of the title of Doctor, and compel earnest workers to claim some other title.

The history of medicine thus proves that the position of every profession depends upon the proper selection of its material quite as much as, if not more than, upon the preparation of that material: and this because of the fact, that success in teaching depends so largely upon the co-operation of those taught. The province of professional teaching is the developement of *professional* capacity: this is as much as the term of study will permit. But the individual character is inseparable from the professional, and so constantly modifies it, that a certain degree of education thereof is indispensible as a foundation upon which to build.

The profession that would not retrogade must therefore make careful selection of the material which it proposes to educate for its specific duties. Hence if Dentistry wishes to be truly progressive it must not admit to its offices and colleges as indiscriminately as Medicine has in this country for thirty years done: and it should not pronounce EDUCATED those who really have no abilities that education can "draw out." How is this to be accomplished? Mainly by the individual and combined action of the members of the profession in the rejection of students, who have not the proper basis upon which to build a professional course of training.

I state the question independently of collegiate training, which will be considered hereafter, and assert that unless dentists UNITE in requiring of all students more *preparatory* qualification, than they now do, no amount of instruction whether of office or college will avail much towards the elevation of the standard of professional excellence. Until we make the meshes of our drag-net larger, we shall be overrun with "small fry;" for no amount of cramming can make a shad out of a gudgeon.

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DENTAL SCIENCE

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It is to this latter point that I propose briefly to ask attention, conscious that my observations, even with the highest known powers of the microscope, though repeatedly made very many times, have not as yet enabled me to affirm anything with entire certainty, yet I shall venture briefly to present the results of those observations.

The red blood corpuscle is regarded as an enduring anatomical element, but I am confident that they are the least so of any anatomical form in the body. I am confident, though as a *demonstration* my observations would fail to establish that conviction in the minds of others, that they are perpetually solved in the liquid sanguinis, and as constantly renewed.

This view is of course equally opposed to the notion on the one hand that they are permanent anatomical forms, and on the other, that they are "destroyed" in any special organ of the body.

The first striking feature of continued observation of these bodies, with *high* powers of the microscope, and without crushing them under the pressure of a covering glass, is that the *size* of each one of any given number of them varies between wide extremes, some being from three to four times the size of others. This great disparity is of course not sufficiently palpable to arrest the attention of the observer except under very high powers.

The opinion generally received is that the human red blood corpuscle is either a cell with red contents, the nucleus of which has disappeared, or that it is a free nucleus of a cell, and which, is not settled.

Neither of these views appear to me to accord with the result of careful observations. It consists of matter of different degrees of density in different parts, being much more nearly fluid in the interior than the outside. To this fact is attributable the depressed centre, which is not however equally visible in all red corpuscles. It has been most generally described as having a cell-wall, after the fixed stereodox form of designation of all such minute ana-

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less, in certain instances, some of the smaller corpuscles in the capillaries can be readily colored. These, however, are very much smaller than the white corpuscles, and do not present their granular appearance. *They are undoubtedly young red corpuscles.* There are, however, other observed facts which can lead to no other conclusion.

In winter, the capillaries of the common frog contain numerous oval corpuscles, not more than half the dimensions of the corpuscle when the same animal is active. In this case at least there can be no doubt of the fact that the former are *young* corpuscles. In the lymph canal, there may always be seen in the intervals of digestion small corpuscles of a similar character, and these may also readily be stained.

These observations lead me to the conclusion that the red blood corpuscle is either the separate form of the aggregations of rounded particles, apparently granular, forming the white corpuscle, or of the corpuscles I have designated found in the lymph canals, and that it undergoes a series of changes, by which it finally becomes converted into matter soluble in the plasma, and that they are thus continually dissolved and replaced.

ARTICLE III.

Trichiniasis.

Pork eaters have been recently startled by alarming announcements of the danger they run in devouring their favorite viands, and begin to suspect that there may have been some medical reason for the rigorous prohibition of this article of food by the great legislator of the Jews. Under some circumstances this meat has proved as deadly as arsenic or strychnia. The public attention which has been bestowed upon it, is our only apology for deviating so far from our ordinary course as to give a brief account of this curious disease produced by measly pork.

The first note of alarm was sounded from Germany, which country has enjoyed a most unfortunate preeminence in this distressing malady. The severest attack, and that which has most attracted the attention of the unprofessional was that of last October at Hedersleben, where, out of three hundred and fifty who were attacked, eighty died. This severe mortality naturally excited much anxiety all over the world where pork is eaten.

The symptoms of the disease are peculiar, and until recently so obscure as to lead to the confounding it with other maladies, such as inflammatory rheumatism, typhoid fever and even Asiatic cholera. Generally the earliest indications are those of gastro-intestinal irritation, arising from the presence of the parasite in the alimentary canal. Vomiting, diarrhœa, violent colic, loss of appetite, and general distress, reaching sometimes to the agony of incipient cholera, ushers in the attack. Headache follows, and then comes on a general swelling of the face. Red watery eyes look timidly from between their swollen lids, dreading any intensity of light. The patient rolls his eye-balls with pain, and the swelling increases till the whole face is bloated. The tongue thickens, and the dropsical glottis gives out harsh and husky tones. The neck hardens, and the corded veins stand out upon its tightened surface. The tortured sufferer tries in vain to stretch his limbs, for every muscle is swollen and resists pressure like a piece of India rubber. The slightest touch is exquisitely painful and motion becomes impossible. The patient lies on his back, his joints locked in the rigidity of tetanus, and the sweat pouring out in astonishing quantities. Sometimes this sweating continues in one part of the body, occasionally in a single limb, after it has ceased elsewhere. All this while the fever rages violently. After a time, the diaphagm and the intercostal muscles are attacked, they stiffen, the patient pants, his tongue grows dry, his weak thready pulse flutters, and in a low muttering delirium death finally comes, and kindly puts an end to the wearing agony.

All cases, however, are not fatal. The majority of those hitherto described have recovered. When the favourable change takes place there is a gradual improvement in the symptoms. The fever subsides, the sweats diminish, the tenderness of the muscles decreases. A swelling sometimes amounting to a general dropsy sets in. The patient moves his limbs, but feebly, and for a long time walking is very painful. The hair and nails fall off, and the skin sometimes exfoliates in large flakes.

The cause of all this distress is the *trichina spiralis*, a little creature that lies coiled up in a small cyst among the muscles. So long as it remains encysted it is without sex and inactive. As soon however as it is introduced into the intestinal canal, it is warmed into a dangerous vitality. Sexual organs are developed, and energetic reproduction begins. The female which is twice the length of the male brings forth her young alive, and spawns from two hundred to a thousand. Her mischievious career is then run, and she is discharged from the intestinal tract. In two or three days or a week after the indulgence in trichinosed food, these swarms of parasites are hatched, and are ready to set up housekeeping on their own account. They are very minute and require a strong magnifying power to see them clearly. When enlarged, they have somewhat the appearance of an earth-worm. With their sharp pointed head they attack and perforate the walls of the intestinal canal,* working their way straight to their destination, the fibres of the voluntary muscles. As soon as their progress is stopped, they envelop themselves in a capsule, and remain quiet until introduced into the alimentary canal of some other unfortunate creature. Hence persons, who survive the first invasion into their muscles of these swarms of enemies, usually recover, and it has been observed that they are apt to become excessively corpulent. Some con-

*Some observers think they pass along the blood-vessels in the current of the circulation, but the statement of the text has the weight of authority in its favour.

nexion has been suspected between trichinæ and cancer, but this is at present only a suspicion.

Pagenteschcr and Fuchs studied carefully the relations of different animals to these pestilent invaders, and found great diversities in their susceptibility to this plague. Of the carnivorous animals, the dog is invulnerable, while the cat is easily infected. We have more interest in those creatures which are used for human food. Of these, the rabbit is very susceptible to this living poison, while sheep, oxen, cows, goats, calves and deer are rarely if at all attacked. Birds enjoy entire exemption, and so do fish, reptiles and crabs. The most easily infected of all creatures is the hog, and it is from it that man obtains these pestilent entozoa. Some cases have been apparently traced to beef and veal, but nearly all the recorded patients have been undoubtedly infected by pork. Where the hog gets these parasites remains as yet a mystery. Various vegetables and animals have been suspected, but the *corpus delicti* has not yet been unmistakeably found on any of them.

Wherever generated, we know that these parasities possess a remarkable tenacity of life. They can endure a cold of thirteen degrees below Fahrenheit's zero point, and still retain their mischievous vitality. Chloroform, arsenic, chromate of potash and other energetic agents will not kill them. Salt was at one time thought to be fatal to them, but patients have been infected with hams that had been salted over a month and smoked afterwards. There is but one power that can destroy them, and that is a heat of 170° and upwards which will coagulate their albuminous tissues. Hertwig, however, says that he boiled meat containing these creatures for twenty-two minutes without killing them, but that a further boiling of three minutes deprived them of life.

We have already stated that Germany was the chief sufferer from this disease. It is remarkable that the French neighbours of these unlucky Germans, who eat the same pork, are never attacked. The difference is manifestly due

to the different habits of the people. The Frenchman cooks his food, the German is fond of eating it raw. His sausages smoked for a short time furnish a large portion of his daily food. So severe has been the penalty he has been compelled to pay for this highly prized luxury, that some of the governments have made the selling of pork illegal until it has been microscopically examined. Trichina, however, has not been confined to Germany. We have long known it to exist in considerable quantities in Western pork. Deaths have occurred in several instances in the United States, and have been traced directly to ham. In all cases, however, the sufferers were Germans, and they had eaten their meat raw.

These facts show that in order to escape infection, it is necessary to do one of two things, either to abstain wholly from the use of pork, or to see that it is very thoroughly cooked before it comes on our tables.

ARTICLE IV.

Osmotic Action. A Lecture delivered February 18, 1867, at the Baltimore College of Dental Surgery. By H. R. Noel, M.D., Professor of Physiology.

(Concluded.)

Law III. Affinity of fluids for each other, we have assumed as being a plain practical fact, as the one is acid and the other alkaline, and therefore the conditions of a current through a membrane are obtained. Each fluid, as it enters the pores, passes to the other side and is dissolved away by the fluid bathing that side, but from previous statements we conclude that the current is stronger from the canal to the vessels, so the circulating fluid takes up and rapidly bears off the contents of the canal. Should the affinity of the two fluids be very strong, but that of one of the fluids for the membrane be very weak, the current is in the direction from the fluid of strong affinity for the mem-

brane to the one of less affinity; or in other words the fluid having an affinity for the membrane, enters the pores at once, and is dissolved away by the other, as fast as it reaches the opposite side; while the current from the fluid of small affinity for the membrane is weak and slow, as in the case of alcohol and water in Lardner's experiment. This may partially explain why alcohol creates such intense thirst—why the victim of a debauch indulges in such copious draughts of water. Theoretically we would say that alcohol has a low endosmotic power, as the affinity between it and the membrane is so small; but its affinity for water causes a flow from the blood to the canal, thus inspissating the blood and causing thirst.

Again after being diluted and slowly absorbed into the vessels, it may still, if not at once burnt off, remain active and cause a flow from the soft structures into the veins and vessels, thus distending them (as was the membrane in Lardner's experiment), and increase the activity of emunctories, as the kidneys and skin, while the soft structures surrounding may be actually inspissated. We could therefore have a perspiring skin—active kidneys—distended veins and yet thirst; for the solid tissues are robbed of their water, or rather of the fluids bathing them by this unnatural perversion of the regular order.

The motion of fluids determines current, other things being equal, in the direction of the most rapid current, the permeating fluid being carried off as fast as it reaches the opposite side, blending with the flowing stream. Here of course the rapidly flowing blood determines the current from canal to vessel, and we could scarcely imagine a sufficiently rapid peristaltic movement of the intestine to cause a change of current to the canal. Other causes may and do produce this reversal of current, but motion is not one of these causes from the very nature of the case.

Writers explain this upon the hydraulic principle of Venturi, viz.: If to the undersurface of a tube containing a fluid flowing through it, another tube be attached, this lat-

ter tube terminating in a reservoir, the fluid in the reservoir will rise through the tube to the flowing current, and the reservoir be emptied. Should the fluid be flowing in a conical tube, and in the direction of the larger end, the fluid rises more rapidly and the reservoir is sooner drained, than if the current was flowing in the opposite direction, &c., to the smaller end of the tube.

This principle obtains in full force, in the problem before us, for the digested mass is moving slowly in the canal while the nutritive fluids are moving rapidly in the vessels, and from those of smaller to those of larger calibre; that is from capillaries to veins, and from lacteals to thoracie duct.

In diseases of the liver, lungs, heart, &c., where the circulation is impeded or retarded ; and where the abdominal vessels are distended, this law may cease to act normally, and even be reversed. We may have deficient and tardy absorption; or even serious diarrhœa by congestion of the portal system, reflex congestions of intestinal veins, perverted action and accumulation of fluid in the canal. Dropsies may occur from a similar course, and we are all familiar with swollen feet as a symptom of severe cardiac disease, or pulmonary trouble.

Law V. Pressure also determines the current, and as here we have the muscular walls of the digestive tract in continued action, rythmical action almost, of course the current would be from canal to vessels. The strong, firm, regular contraction of the muscular walls upon the mass of digesting material greatly facilitates its absorption. In atony of the muscular coat you would expect deficient absorption, for one important element in the osmotic process is wanting. Abuse of narcotics has the same influence, for the deadened nerves refuse to respond to their normal stimula, and the physicoreflex action of the spinal cord, which regulates the peristaltic movements of the canal fails to be exercised.

Whatever produces muscular atony, whatever deadens the nerves, may cause deficient absorption, indigestion, dyspepsia, &c.

Law VI. From an acid to an alkaline fluid, would be from canal to vessels, and therefore the excessive use of alkalies in any form might not only impair digestion proper, but even bar absorption by interfering with this law of osmotic action. Perhaps the use of mineral acids, so popular now in treating typhoid, and typhus fevers, may have some bearing upon this principle, and their antiseptic and digestive powers be still further enhanced by the fact that absorption is also promoted. Certainly the muceous membrane and system generally respond kindly to their exhibition.

But this is not the only instance of motion from an acid to an alkaline fluid, that the body offers us.

Recall for a few moments the discussion of the "Essential Nature of Muscular Action," as given you in a previous lecture, and you will at once perceive how, theoretically at least we can apply this law of current from an acid to an alkaline fluid. The acid muscle juice bathing the fibrillæ, fibres and fasciculi, the alkaline blood of the capillaries taken together, give us the conditions not only for osmotic action, but also the condition of a voltaic circle; conditions of chemico-electrical phenomena.

Assuming that acid muscle juice is an effete product:—result of disintregration, in the descending metamorphosis, and therefore passing rapidly from the dominion of vital to that of purely chemical forces, we can at once appreciate the resort to chemical and physical forces in the osmotic disposition of it. Possibly in the thorough economy of nature, the absorbents may take up, and the lymphatic glands elaborate a few of the elements until sufficiently vitalized to go once more the round of the circulation; and subserve the purpose of nutrition, but the muscle juice as a whole, we none the less consider to be intrinsically

effete. Yet in apparent contradiction of this law, the alkaline blood supplies the fibrillæ with plasma and oxygen; the means of destruction and of repair at the same time, so here are two osmotic currents. Perhaps the powerful affinities and forces developed in the chemico-vital processes of nutrition and assimilation, may be sufficiently strong either to equalize the two currents, or to bring only nutritive elements and oxygen through the membranes as neutrals, and destitute of any affiliation as to chemical reactions, with either fluid. The homogeneous, delicate, thin membranes of the capillaries and the sarcolemma, have other and higher functions, therefore, than the mere physical one, of protecting, defining and limiting.

VII. Law. Activity of osmosis increased by temperature. This is true of almost every act performed in the animal mechanism, for Heat is one condition and essential of life, and all phenomena of life, even those apparently involving principles purely physical or chemical, are manifested through vitalized structures, and must therefore be dependant more or less upon heat.

The physical and the vital forces are so blended in all the phenomena of life, their laws and conditions so inextricably interwoven that to isolate each—to define the domain of each, is beyond our finite intellects. Man may, in course of developement, be able to examine, measure and classify all of the purely physical; but he has not yet reached that stage, and even should he ever reach it, the "essential nature of vitality" will be still beyond him. In applying the physical principle involved in osmosis, to organized structures, we leave at once the field of rigid mathematical reasoning and enter that of the speculative.

Dr. T. K. Chambers gives another condition as being essential to rapid and complete osmosis; and it is probably the one which should have first claimed our attention.

It is "a clean healthy mucous membrane." A membrane covered with tough, tenacious mucus is in the worst possible condition for the exhibition of osmotic phenomena.

Hence cathartics may often be really, good promoters of osmosis, by sweeping clean the digestive tract and thus bringing the fluids in closer approximation; besides exerting a remedial influence upon the vital powers of the tract. They thus enable you to throw more promptly nutritive material and medicinal agents into the vessels.

Chambers gives several cases as examples; cases almost demonstrating as a fact, "that a clean mucous membrane is an essential for normal digestion and normal absorption," Even in anemia if chronic, he will often premise his treatment by a brisk cathartic; sweep the canal free of the tough, tenacious clinging mucus, "clear the decks for action," and then, by generous diet regularly administered at short intervals, and with prompt medication by tonics, iron, &c., throws rapidly into the system the largest possible amount of thoroughly digested material with the best remedial agents, and of course his patients rally as if by magic. As a practical fact, if you wish thorough digestion, thorough absorption, rich blood, red and strong, keep your digestive tract free of this mucus.

Beware of overtaxing your digestive powers, beware of irregular hours and broken meals; beware of habits inducing constipatation and costiveness; beware of severe mental labor soon after meals, or you will violate the laws of normal digestion, violate the laws of normal osmosis also, and the Nemesis of dyspepsia, indigestion, flatulence, and colic will seize upon you and claim a long penalty.

Osmosis, though discussed in relation to digestion and absorption from the canal, has a much wider range both in the animal and vegetable world, than we have been able to give it. All mucous membranes, all synovial and serous membranes, all cells and cell growths, all glandular structures, all muscular action and phenomena, in a word the whole animal economy even in its veriest minutiæ, exhibits more or less of the osmotic action, and depends more or less upon its laws and conditions. Entering

into nearly all the phenomena of life, it pervades the system as one of the subtle conditions of existence. Beginning as imbibition and cell action, with the ovum, in the Graafian vessels of the mother, it lasts longer than life, ever active, ever acting ; for when this mechanism, wound up to run its short span of time, ceases from any cause to evolve the conditions necessary for the exhibition of vital phenomena, and vitality is lost; this still retains its power, and as it began when our relations first commenced with our human mother, so is it prolonged until our individuality is lost, and the decomposing wreck, the debris of life crumbles to the bosom of our last mother—the earth.

ARTICLE V.

Dentistry as a "Fine Art."

By NORMAN W. KINGSLEY, Professor of Dental Art and Mechanism, in the New York College of Dentistry.

THAT "Dentistry is a Science and an Art" is a statement that at this day it seems hardly necessary to reiterate.

The phrase has a royal sound, and its frequent repetition, shows that it is a favorite expression ; and yet among the multitudes who earn their livelihood by practicing dentistry, how few know the full meaning of the words, and how little there is in their practice to justify the assertion.

To judge by its fruits, how much more there is of Empiricism than of Science ; and how much more of rude and bungling Mechanism than of Art. Nevertheless, Dentistry *is* a Science and an Art, and the researches of the past four years alone, together with the contributions to its literature, give a legitimate claim to the first part of the proposition. Months and years have been spent in the prosecution of it as a Science, and volumes record its results ; but as an Art, capable of taking rank as one of the

Fine Arts, Dentistry has rarely, if ever, found in our Journals, an advocate; has rarely found else than a flippant consignment to the workshop, where the very idea of art comprehends only ordinary mechanics.

As a consequence, Artistic Dentistry has never risen, except in rare individual cases, to anything above mechanical dentistry; the very term by which the department is known is often used as one of reproach, and the productions of these dental mechanics are a standing disgrace. In every assemblage, public or private, on the street, in the drawing-room or wherever we may turn, we see displayed their hideous deformities. It becomes a serious question whether the art of dentistry, aside from operations upon the natural teeth, has, with all the inventions and "improvements" of the last decade, advanced one iota.

The Operative department has assumed to be the department, *par excellence* and *per se*, and we see the results in the education of the new professional generation, who ignore as unworthy *their* exalted talents any knowledge of mechanical dentistry, not realizing that a mastery of all its elements will do more to educate and qualify them for perfection, even in the one department, than any other course that could be pursued. We believe that it can be demonstrated beyond a peradventure, that the ignored and despised branches of dental practice can lay a well grounded claim to be considered as a Fine Art, capable of the highest idealization, ranking side by side with Poetry, Music, Painting and Sculpture, capable of appealing, though in a more limited manner to the same sentiments and emotions, and requiring for their expression the identical talent and same imagination which characterise the votaries of her predecessors.

With the ancient Greeks, all works which exhibited skill were called works of Art, and to the present day the term Art in its broad signification is applied to every skillful, physical or intellectual performance, from the making

of a shoe to the modeling of a statue, from the pantomime of the stage to the oratory of the forum. But as the Arts have multiplied, terms of distinction have become necessary; as, Fine Arts and Mechanic Arts with all their subdivisions.

The distinguishing characteristic of the fine arts is their ideality, in this the line of demarcation between them and the mechanic, and all other arts is unmistakably distinct.

It is for this feature we look in any work that claims this high rank, and by this standard we judge of its pretension. The mechanic arts are distinguished for their physical utility; they may demand consummate skill for their execution, they may require for their development rare inventive faculties, and their combinations of mechanical principles may be truly wonderful, but their individual works require but little effort of the brain in their re-production; education in skillful manual labor without the capacity to originate a single new idea is all that is required. The laws which govern their re-production are those of mathematics, and to be able to copy a given form with exactness is the sum of the talent required.

They may be directly of more practical value to mankind, but they can make no appeal to the finer emotions of our being. In all that excites the imagination, that calls into action the affections or leads the mind away from the contemplation of the material and sensual, they are dumb.

In like manner the feats of the acrobat and juggler excite our wonder and admiration, but like the true mechanic arts have not an element of ideality in them.

The ideal or Fine Arts therefore may include Poetry, Music, Painting and Sculpture. These require for their development the possession and exercise of the same mental faculties, are governed by the same general rules, and have one common ultimate object.

Poetry, of all the arts, stands deservedly at the head, because the most subtle, and at the same time the most po-

tent in its influence. It is the least material of all, the farthest removed from sensible objects; it has the greatest scope, admitting the treatment of all subjects, and its power over the imagination is the most complete. "In regard to the objects of the visible world one cannot conceive a greater distance between what it depicts, and the manner of depicting. By the combination of words alone used as language, poetry gives full expression to every idea from the most powerful to the most delicate, and presents scenes so vividly as well as so variedly to the mind of the reader that the impressions are both pleasing and permanent."

Music takes precedence over Painting and Sculpture in the order of the Fine Arts; its claim to superiority being based upon inherent qualities of human nature; by whose control all that appeals to our emotions is more regarded than what appeals to our understanding. Objects of sight, while they please the eye by their color, form an arrangement, affect mainly the mind, and only indirectly approach the heart.

But music speaks directly to the soul. Its notes are the re-production and the refinement of natural tones of pleasure, anger, fear, distress, etc. These tones, music cultivates, and by prolonging and combining them, expresses feelings and awakens every variety of emotion into sympathetic activity. Thus the tender pipings of the flute call forth the love of enjoyment; the clear bugle notes find responsive echoes in the hearts of mountaineers and huntsmen; the orchestral overtures send thrills and throes through fancy loving souls; and the choruses of Mendelsohn and Mozart fill man's spirit with ecstacy of joy or wonder, or with solemn awe.

More than any other Art, is music universal. A language without words, music addresses the feelings by tones, everywhere understood and unmistakable; and it leads forth the emotions to an enjoyment which words cannot give, nor can even express.

Painting in the order of the ideal Arts holds the third rank. It is more limited in its scope than either of its predecessors, and expresses its sentiments or tells its story by the color and lineal appearance of bodies.

But while it cannot undertake the relation of a succession of events in one representation, it has the advantage over Poetry, in that its language is universal, easily recognized, and needs no interpreter or translator of its meaning,

"A true picture tells its own story,"

and in no way does the common mind receive more vivid and lasting impressions of portrayed events, than by the productions of this art.

Many pictures there are whose sentiment is sacrificed to that which merely pleases the eye, the gratification of the senses by the harmony of forms and color, being the highest aim of the artist. It is this degeneracy into mere physical representation, and the limited nature of its power, that places it as an ideal Art in the rank that it occupies.

The art of sculpture while requiring for its execution the very highest order of mental faculties, is generally placed in the scale of ideal arts, below that of painting, because represented solely by form, and without the aid of color, it is more limited in its subjects and more material in its exhibitions.

In the selection of the human figure, the most perfect of all forms, it finds its grandest achievements in depicting all gradations of intelligence, affection, sentiment, action or passion: sublime, heroic or tender, and in all orders of beings from the exalted supernatural to the lower gradations bordering on the brutes. Although the most limited in its scope, it is not so liable to degenerancy as its sister art of painting; to be sucessful, its delineations must be above that of simply copying nature, and its power over the beholder is often greater than any other art could give to the same subject.

It is the most enduring of all arts; the material chosen for its medium being the most independent of all the mutations of time. Of the peoples of the by-gone ages, the only records left to us that give even a passing glimpse of their existence, are their sculptured monuments.

Like painting and music its language is universal, and like painting when it ceases to appeal to the imagination, and seeks only to please the senses by the beauty of form, it degrades its character and fails of its true mission.

"Nothing brings people of other nations so vividly before us as their works of art. They tell us of their religion, of their social dwellings and customs, of their advance in civilization and religious culture. To the study of ancient history a knowledge of the arts as practiced by different nations is indispensable. Language is more or less subject to change and decay, and the significance of many expressions is lost to those who do not use it as a vernacular tongue." Many nations have existed with no written language, but the Almighty in blotting them out from the face of the earth has permitted their works of art to live, from which something may be learned of their rise, progress and character.

Architecture is very commonly regarded as one of the fine arts, and ranked next to sculpture and painting. Modern architecture is addressed to the eye and the intellect alone, and not to the imagination, and the ideal character necessary to distinguish a fine from a mechanic art is wholly wanting—wherever this element does exist in buildings of the present day, it has borrowed it from sculpture. But architecture among the ancients was one of the earliest of symbolic languages. The pattern shown to Moses in the Mount by God, as the model for the building of the tabernacle, embodied the very highest order of ideal art.

Every post, every board and every bar, every ring, and every curtain, were typical of man's redemption from sin, and spoke a language unmistakable, and clearly compre-

hended by the Jews. And so with every monument of the ancient heathen connected with their religion, every temple, every idol and every altar appealed to the imagination and spoke an ideal language.

Architecture was then emphatically a "fine Art," but at the present day it is but an imitation of the dead past. The powers that called it into existence are gone, and the emotions to which it gave birth have died out. We imitate its corporeal form, but the spirit that gave it life is forever departed.

We have been thus specific in our description of the Fine Arts for a more thorough understanding of grounds upon which we shall base the claim of Dentistry to be ranked with them. No performance of the dentist can make any pretension to be a fine art, separate and distinct from all others; but as a sub-division or speciality of one of the arts, dentistry is entitled to a consideration which it has never received. We shall endeavor to show this alliance, and prove that, so far as its scope will allow, it is governed by the same general rules which control its allied art.

Dental practice, by an inherent law and by common consent is divided in the main into two departments; the one commonly termed the "Operative" which is made to include all efforts for the preservation of the natural teeth, and all surgical operations in the buccal cavity; the other called "Mechanical" which includes the making of all appliances for the correction of deformities of the buccal cavity; but principally the making and inserting of Artificial Teeth.

In the practice of Operative Dentistry as has been before intimated, there has grown up an unwarrantable assumption that all that was refined and cultivated, all that was worthy the exercise of our noblest faculties in the pursuit of our profession was to be found in this department—and mere mechanics, wholly unqualified by education in Science and Art, were deemed capable of practicing the other.

The only performance of the Operative dentist which requires a talent and skill equal to the mechanic arts is the introduction of fillings into the cavities of decay, and this skill is mere manual dexterity guided by good judgment; its highest achievements at the present day are in the so called contour fillings made of gold, in which an attempt is made to restore the form of a tooth injured by accident or decay.

Contour filling when carried to its highest state of perfection in restoring the actual or the typal form of the lost organ, can present no stronger argument to be considered an artistic performance than that of a copy or an imitation. If a copy it is purely mechanical, if an imitation of the typal it may lay a feint claim to ideality. This is true when carried to its ultimate; but practically nine-tenths of what are called contour fillings are not entitled to any such distinction. Nuggets of gold they are, built on to deformed teeth, carried in many instances far beyond the borders of decay; lapping over and building up on solid enamel to a general level, obliterating all inequalities and all character, and failing most completely to illustrate the possession of any other talent than the skillful manipulalation of gold, excellent advertisements of the craft they undoubtedly are, but are certainly of very questionable taste.

Every tooth has an individual character and expression, not only in harmony with every other in the same mouth, but by the same divine law, in harmony with the features and the character of the creature, be he animal or man.

These physical characteristics are so marked and prominent that the merest novice has no difficulty as a rule in locating any human tooth that has been removed from its fellows; and yet of the attempts at restoration of any large portion of the crowns of teeth by dentists, how few there are that bear any very close resemblance to the original form of the lost part.

If a cast were taken of the restoration and examined separately, how few would identify it as being any portion of any tooth. The cusps, the depressions, the sutures, the easy and graceful outlines and all that marks the individual tooth are wanting.

With the same portion of a natural tooth even duplicated in another material, as a perfect copy in plaster, there would be no hesitation in identifying its locality with a tolerable certainty, but a cast taken of many a restoration would not be suspected of its original application.

Of the utility of this branch of practice and as a field for scientific research—pecuniarily remunerative—there can be no question, but as affording an opportunity for esthetic culture, it bears no comparison with its associated department.

If Sculpture necessarily ranks below Painting in the scale of the fine Arts, because more limited in its range, and Painting for the same reason below Poetry; we must therefore place all operations on the natural teeth, as artistic performances in rank, below that of the substitution of artificial ones.

As an Art it is but a department of Sculpture. *Form* in individual members, *form* in grouping and arrangement, and *form* as a medium of expression are equally the distinguishing characteristics of both Sculpture and Dentistry.

(To be continued.)

CORRESPONDENCE.

ARTICLE VI.

Letter from Paris.

Editors American Journal of Dental Science,

Gentlemen:

A surgeon of some eminence in his profession at Ghent has, recently published an account of a method of treating wounds with dressings of sheet-lead. From

the 1st of January, 1864, to the end of May, 1866, Dr. Burggraeve has treated 236 cases in this manner, and only 8 deaths have occurred. His process is exceedingly simple. It consists in washing the wound carefully with luke-warm water, and then covering it with pieces of sheet-lead, which are secured with adhesive plaster. Most of his patients have been workmen injured by machinery, and were too weak to undergo operations owing to the impoverished state of their blood.

"The wound," says Dr. Burggraeve, "whatever may be the amount of contusion, crushing, or laceration, is first washed carefully without detaching or cutting away any portion of flesh, since in the state of torpor it is impossible to say at once which will mortify, and which may be preserved, and one runs the risk either of cutting away too much or too little. It is next surrounded with thin slips of lead, retained in position by sticking plaster. From time to time a jet of warm water is injected under this armor, if we may use the expression, so as to remove the ichor and refresh the parts." In order to watch the progress of the wounds, each sheet of lead may be removed independently of the others. The contact of the metallic lead with the flesh causes no irritation, and the rigidity prevents friction, and excludes the air,—a very important point.

Besides the mechanical action of lead, Dr. Burggraeve thinks that it may also be attended with some physical action, and quotes the well-known effects of Goulard's extract. The author enlarges on the value of this method of treatment in military surgery, where operations must, at least in active service, be somewhat hurried, and many a limb which under ordinary circumstances, might have been preserved, is sacrificed in consequence.

Gun-shot wounds, he says, have much analogy with injuries caused by machinery, and we may reasonably assume that the results will not be dissimilar.

Whatever the theoretical objections to lead bandages

may be, they appear at all events to have had a fair trial, and to have been productive of good results.

J. D'Oyley-Evans.

ARTICLE VII.

Messrs. Editors:—

Happening to ask an esteemed friend and professional brother from the state—I beg pardon, the territory—of Georgia, what he thought of the action of the Pennsylvania College, I was made to feel very much like a reconnoitering party who had come unexpectedly upon a masked battery.

As soon as I had recovered somewhat from the suddenness of the discharge, and found that no bones were broken, I ventured to ask my friend to put a little of his thunder and brimstone on paper. I am afraid his pen was a steel one, and not a goose quill, and his ink had in it rather more of the gall of bitterness, than the genuine Aleppo galls, which the receipt calls for. But the Angel of Mercy, who writes with the pen of justice dipped in the indellible ink of truth, has written so very little of late for our papers and magazines, (having been severely paralyzed six years ago,) that really it would be hypercritical in an editor to object to an article because it smells somewhat of sulphur.

" A college has seceded! Had it been the Baltimore College, we should not have wondered, for that rebel city has never been loyal except by compulsion, under force of the argument of bayonets. But it is the Pennsylvania College; in a state overflowing with loyalty and patriotism; a state which has contributed more than perhaps any other towards crushing out a wicked rebellion: the only loyal state whose sacred soil was laid waste by the sacrilegious southron. Alas! that the bitter teachings of four years of

civil war should so soon be forgotten, that in the very hot-bed of patriotism, this noxious weed of secession should dare to spring up. Surely the whirlwind of war must have scattered the seeds of evil growth far and wide.

"The Constitution and the Union" of the United Colleges is in danger. A rebellious minority rejects our wise amendments to that constitution, and proposes a scheme, which practically "nullifies" the great principles of union. How shall we meet the issue, and maintain intact the grand truths, established by our late glorious struggle—that a state (a college) has no rights; that a minority has no rights; that the voice of the people (i. e. the majority) is the voice of God? What measures shall we adopt, to re-establish a "Republican form of government" in the profession, and to show that our system is the "best the world ever saw."

"O for a Sumner to speak in classic strains of the "barbarism" of these rebels: a Butler to enforce *taking* plans for their subjugation; a Stevens to elaborate some scheme of confiscation, which, like his last, shall so exquisitely temper justice with mercy. Let our watchwords be "Might makes right." "The end justifies the means." "The people can do no wrong;" and for our Marsellaise let us sing that "He who has the power may take,

And he may keep who can:"

for in these grand sentiments lies the death knell of secession, and of all attempts of any minority to control or dictate to, the omnipotent and infallible majority.

"We will take a lesson from Judge Advocates, and accept insufficient or manufactured evidence in condemnation of rebels; for "justice to traitors is treason to loyalty." On the testimony of a student, who was refused admission, and of another who was rejected on examination, we are prepared to prove that the Professors in this "seceded college" are unfit to teach dentistry. Our sentence would be that their Diplomas be revoked; that all loyal men

having their photographs "turn them to the wall" and that their professional life meet the fate of Mrs. Surratt.

"We will take a lesson from pious New England. For if "if rebellion is as the sin of witchcraft," and the witch could be purified only by "fire and faggot," what severity of punishment is too great for the rebel.

"We will take yet another lesson from the late war, and close their ports of entry. They shall have no students; or, if any run the blockade, they shall not be recognized as members of a loyal profession, but shall suffer the penalty of perpetual disfranchisement. We will declare "contraband of war" all the "medicines and necessaries of [professional] life" and then when we have rescued some wretched victim of their starving Andersonville-like system of teaching, we will distribute, broadcast throughout the profession, mental photographs of this unanswerable proof of their depraved and inhuman practices."

At this point, I ventured to arrest the flow of patriotic enthusiasm, in my "reconstructed" rebel friend. I could easily understand how, in his strong desire to make up, by excess of loyalty, for past defection, he might go beyond the mark: and could excuse his indignation at seeing things allowed at the North, which were so mercilessly punished at the South. But I could see plainly, in the very language used, that he was confounding ideas political with things intellectual and educational; and that, if his arguments had any force, it could only be by bringing our Dental Colleges down to the sumner—stevens—butler level. This could not be permitted.

The unanswerable logic of conquest may prove that states and minorities have no longer any "rights:" but in the kingdom of science and art the appeals of reason and justice are not as yet made in vain. The Pennsylvania school has the same right to secede that South Carolina had under the old constitution; but the college had per-

haps less excuse or provocation than the state found in view of grievances, past, present or prospective. It may be the Northern college will find secession as unwise a remedy as did the unfortunate Southern state.

I propose elsewhere to consider at some length this action of the Pennsylvania school, and shall not speak further of it here. I only make these remarks least I should be considered as endorsing fully the measures proposed by my rather "too loyal" friend. I suggest their publication, because it is well to look at so important a subject from all possible positions. Perhaps some rampant loyalist, late convert to conservatism, might present the subject from another and quite different point of view.

Yours truly, P. H. A.

SELECTED ARTICLES.

ARTICLE VIII.

Bleaching Discolored Teeth.

By Professor J. H. M'Quillen, M.D., D.D.S.

It is a somewhat remarkable and inexplicable fact that none of the text-books which have been presented to the profession, so far as my observation goes, pay even the compliment of a passing notice to the means whereby discolored teeth may be improved in appearance. Whether the subject was regarded as unimportant—the methods so well known as not to require description or comment—or the authors did not know of any other means of eradicating such difficulties other than by extracting the offending organs, is hard to say; and yet when recalling instances in which the beauty and symmetry of sets of teeth that truly rivaled pearls in their color, brilliancy and perfection of structure and form, have been entirely marred by an unsightly

blackened or discolored tooth, the importance of the subject becomes apparent, and it is not surprising that the presence of such teeth should be a constant source of mortification and annoyance to the patients, or that they should desire to be relieved in some way or other from the source of trouble. When all efforts to remove the discoloration has proved unavailing, a strongly developed feeling of pride of appearance has not unfrequently induced patients to insist upon extraction, and practitioners have been found willing to comply with the request, although in all other respects the teeth were good and useful organs.

The shades of color presented by such teeth vary greatly, and depend upon the cause producing the discoloration and length of time that it has existed; thus it may be of a rosy or even a scarlet hue when recent; or brown, greenish, or black when of long-continued duration. A fall, a blow, or exposure to thermal influences may do such violence to a tooth that the vessels of the pulp will become congested to an extent that rupture of the blood corpuscles will take place, and the hæmotine or coloring matter of the blood uniting with the liquor sanguinis, being carried into the dentinal tubuli, gives to the tooth a rosy appearance, and in the case of very young persons, where the dentinal tubuli are very large, the color sometimes reaches a brighter red. The treatment indicated under such circumstances is to drill at once into the pulp cavity, so as to afford a convenient place of exit for the blood. In some cases the discoloration will disappear in a very short time after the removal of the pulp by syringing the pulp cavity with tepid water; in other instances the employment of additional agencies, which will he named hereafter, may be required.

Devitalization of the dental pulp may ensue from the causes referred to above, with little or no evidence of the fact until the attention of the patient or friends is arrested by a slightly darkened appearance of the tooth. It is in

cases such as this that the acuteness of vision and judgment of the dentist are frequently put to the test, and it is important that he should be prepared to decide promptly, so as to afford the proper attention immediately, and prevent additional and permanent discoloration. In cases of doubt, the employment of a strong, clear, and steady light, falling directly upon the tooth, combined with the reflection from a good mouth mirror held back of it, will afford an opportunity to institute a comparison between the affected organ and the adjacent healthy ones, and readily decide the question. In other cases, the extreme dark discoloration tells the tale in a forcible manner. In the treatment of exposed pulps it is not an unusual thing, in the hands of careless practitioners, for the teeth treated to become discolored, and even with the greatest care on the part of the experienced, skillful, and pains-taking, some evidence of the loss of vitality will occasionally be made manifest by a slight change of color in teeth treated by them.

The coloring matter of the blood absorbed by the tubuli remaining there, changes to a dark or blackish hue, and imparts to the tooth the variety of shades already referred to, or the absorbtion of the oral secretions, mixed with foreign substances, in teeth where the pulp cavities are allowed to remain open for some time, may induce the same result. Too much care, indeed, cannot be exercised in protecting a tooth from such influences.

As in the case of the rosy tooth, the first indication when treating a dark discolored tooth, is to open into the pulp cavity, if not already exposed, with a drill; or remove the filling in a case where the pulp has been treated with the arsenical paste, and then syringe the cavity freely with water, so as to remove all decomposed or foreign substances; after this the employment of one or the other of the following combinations of chlorine with soda, lime, or potash, will be found, as a general thing, efficacious in re-

storing a tooth to its natural color. The active agent in bringing about this result, of course, is the chlorine, whose chief characteristic is the bleaching power it posseses; decomposing in a rapid and remarkable manner the most stable organic coloring principles, by combining with and removing the hydrogen present in the coloring matter. On account of this property it is largely used in the arts, particularly in bleaching linen and cotton goods prior to their employment in the manufacture of paper.

Labarraque's liquid, the Liquor Sodæ Chlorinatæ, U. S. Dispens., is one of the most reliable articles in bleaching discolored teeth, and much less objectionable than the other preparations, which will be named. When using it, a pledget of cotton of suitable size, to admit of an easy passage into the bulbous portion of the pulp cavity, should be saturated with the liquid and placed in the tooth, and allowed to remain there about thirty minutes or so; during this time the fluid permeating the dentinal tubuli comes in contact with the coloring matter and decomposes it. In teeth slightly discolored, a single application may suffice, while repeated applications will be demanded in cases where the discoloration is very great or long continued. Care should be exercised in making the application not to allow it to cause unnecessary annoyance by coming in contact with the tongue, as the taste is very disagreeable. This can be readily prevented by covering the pledget of cotton with a temporary stopping of wax and cotton.

Chloride of Lime, or Calx Chlorinata, U. S. Disp., the bleaching powder of commerce, is sometimes employed by dental practitioners, and when used with care is a very valuable agent; but its exceedingly disagreeable odor, and its powerfully destructive action on organic structures, are objections which demand that it should be employed with the greatest caution, or it may do more harm than good. This article when fresh and well prepared is a soft, white powder, which attracts moisture from the atmos-

phere, and is soluble in about ten parts of water. In this connection it may be well to state that the presence of water is essential in securing the bleaching properties of chlorine, for the gas, in a state of perfect dryness, is incapable even of effecting litmus paper. It should be applied on a pledget of cotton in the same manner as the article first named.

Chlorate of Potash, Potassæ Chloras, Lond. Pharm., may be employed with advantage, but, like the chloride of lime, must be used with judgment and discretion; either of these articles, in the hands of ignorant or careless operators, may become a source of great discomfort to patients by exciting intense irritation and subsequent inflammation in the perodental membranes. The proper way to prevent this is to fill the cavity in the roots with cotton prior to making the application.

In the intervals between the application of the chlorinated preparations, the pulp cavities should be protected from external influences as much as possible by temporary but efficient stoppings.—*Dental Cosmos.*

ARTICLE IX.

Compound Comminuted Fracture of Maxillary Bones.

By J. M. Snyder, M D., Maple Row, Romney, Hampshire County, Va.

On the evening of the 17th of April, Capt. Richard Sloan was kicked by a horse upon the right side of the face, fracturing the lower jaw-bone the foot of the horse came in contact with tbe lower jaw-bone, in a horizontal direction, the full force of the blow being received between the symphysis and right mental foramen. The fracture extended in an oblique direction from the external surface of the jaw, at the first molar tooth internally, to the spina interna , without displacing any of the teeth—except perhaps, slightly, the cuspid tooth. The internal end of the

fracture, involving a portion of the spina interna, was comminuted, and a small portion of the bone came away during the progress of the case. There was another fracture between the lower edge of the coronoid process and the first molar tooth; and in the space of the attachment of the mylohyoides muscle, which was distinctly transverse, and could be easily discovered by the very uneven form of the internal surface of the jaw, and the distinct irregularity of the alveolar arch. This fracture was also comminuted, but no pieces of bone came away. The fracture could be very readily reduced; but to retain it in coaptation was found to be the great difficulty. The bandages in common use for such cases, and flat corks between the teeth, together with a covering of pasteboard adapted to the shape and made to fit the jaw, were used for a few days, but very unsatisfactorily; so that it was evident great deformity must ensue unless some more effectual method were soon adopted to prevent motion and insure permanent coaptation. The great severity of the kick produced considerable concussion and the usual concomitant symptoms, though not alarming in their character.

The Captain recollected nothing of the accident, and only remembered having been in the stable with the horse. No abrasion of the facial integuments was discernable until after some days, when a slight contusion was observed opposite the cuspid tooth, with slight ecchymosis.

The superior maxillary bone was also fractured, but not extensively; three of the teeth, viz., two incisors and cuspid, were forced from the alveolus, and the aveolus itself was crushed to the extent of one and a half inches immediately above the anterior fracture of the lower jaw. The palatine plate was also implicated in the fracture, but without loss of substance.

I found the patient, five or six hours after the accident, suffering intense pain in the fractured part, which was much swollen. I supposed the pain was of a neuralgic

character, rather than the result of any inflammatory action, for the circulation had not as yet reacted. This pain, I had no doubt, was kept up by the irritation caused by displacement of the fractured bones, and would subside after the fracture was adjusted, which I found to be the case. About twenty hours after the accident the system reacted powerfully, requiring depletory measures. VS. xxiv. ounces, saline catharthics administered for a few days, together with spts. nit. dulc. and tart. ant. et potassa, and the antiphlogistic treatment generally, until the inflammatory symptoms subsided, when I proceeded to adjust the fracture in a more permanent manner. For this purpose I had made, by a silversmith a thin silver plate, half an inch in width, and sufficiently long to reach from the posterior external part of the second molar tooth on one side to the same point on the other side, covering the symphysis in front, and perforated with very small holes, the width of each tooth apart, and three sixteenths of an inch from the top of the plate. After flexing it so that it fitted precisely the shape of the jaw, I applied it, and with the aid of an assistant succeeded in placing a very small silver wire around the tooth at each extremity of the plate, and drawing each end of the wire through the holes in the plate, and through the small tubes of a double silver canula, twisted them until the bone was drawn to its normal position. Wires were also attached to some of the incisors, for the purpose of keeping the plate more permanently fixed. The plate being elastic, a constant traction was kept up from within outwards, thereby counteracting the displacing action of the mylohyoideus, pterygoid, and masseter muscles. The plate was permitted to remain fifteen or eighteen days, when it was removed. During the progress of the case, to correct fetor and encourage healthy action in the mouth, the solution of chloride of soda was frequently used with a very happy effect.

The Captain suffered from neuralgic pains of the legs, which ultimately subsided, and in thirty days he was discharged cured.

The points of interest in the above case seem to me to be these:—

1. The bone could not be retained in its natural situation by the usual method of bandaging, on account of the strong displacing action of the submaxillary muscles.

2. There being both an oblique and transverse fracture very near each other, and a distinct natural irregularity in the arch of the teeth, rendered it impracticable to retain the fractured ends of the bone in apposition. It therefore became important that some more effectual method of reduction should be adopted, and the above-described plate suggested itself as the best. The fracture never became displaced after its adaptation, and reunion was rapidly and permanently established in about fifteen or eighteen days.—*American Journal of Medical Science.*

MONTHLY SUMMARY.

Liebig's Extract of Flesh.—At the Pharmaceutical Conference, Nottingham meeting, last year, Messrs. Dean and Brady presented a paper containing the results of examination of this substance. Several samples were examined, but we are chiefly concerned with that prepared in South America, by Herr Giesbert, and sold with the approbation of Baron Liebig. In this, these gentlemen found a considerable quantity of gelatin.

Their investigations have not thrown much additional light on the subject. They found acid phosphate of potash, chloride of potassium, kreatin, a substance which they supposed to be kreatinine in combination with some acid, probably phosphoric, and a quantity of colloid bodies. They failed to find phosphate of magnesia which other observers have detected, but noticed during evaporation the evolution of ammonia which may have proceeded from the splitting up of the ammoniaco-magnesian phosphate. They consider that the value of the extract is greatest in proportion to the quantity of crystalloids present; and the better specimens, as judged by this test, deliquesce more readily than the others.

This paper has called out a note from Baron Liebig, who states that the manufactory at Fray Bentos in South America is superintended by one of his former assistants, that the extract is made according to his formula, that it is packed in tin canisters of 36 to 45 pounds each, and that none is sold until after analysis and approval by him. He denies that it contains any gelatin.

He says that the presence of this last named substance gives greater consistence to the extract, allows it to retain more water, and renders it more liable to mouldiness.. By excluding gelatin, the yield is diminished, so that only one pound of his extract is obtained from 34 pounds of fresh lean meat or 45 pounds of butcher's meat, including fat and bones. He objects to the tannin test for gelatin, as this reagent throws down from the cold water extract a precipitate having all the properties of tannate of gelatin and only to be distinguished from it by not gelatinizing when concentrated.

As for the difference in color and taste, he says that it is due to the difference in the sex and age of the animals yielding the meat for the extract. The flesh of oxen gives an extract of darker color and higher flavor, the latter resembling that of venison. Cow's meat furnishes an extract of lighter color and milder flavor. The flesh of animals under four years of age cannot be used for this purpose, as it yields a pappy flavorless extract. The extract of ox meat is richer in creatinine and sarkin than that of cow's meat. This extract is often adulterated with common salt. He mentions an extract made by Dr. Turner of Darmstadt which contains 26 per cent. more water than Liebig's extract besides 9 per cent. of salt.

Liebig states expressly that he has kept all the details of the process to himself, having given only general directions for the manufacture. He says that there have been but two special formulæ given, one in the Bavarian Pharmacopœia, the other in the Pharmacopœia Germanica, but he expressly declares that neither of these is his.

The question of the dietetic value of extracts of this kind has been raised at the Society of Arts, and Dr. Thudichum was called upon for his opinion. The doctor stated that they lacked the essential properties of nutriment. He considers that they contain a stimulant analogous to those belonging to tea and coffee,

which acts strongly on the heart and brain. He says there is not so much nutriment in a teaspoonful of the extract as in a mouthful of meat. Beef tea contains ingredients, especially creatine, the action of which resembles that of theobromine, and also potassium salts, so useful in the production of muscular power. It has besides several acids such as lactic, which heightens the flavour of meat, and has much to do with the appetizing property of osmazome. Too strong a solution of extract of meat is as bad as too strong tea or coffee.

The nutritive elements of meat which are wanting in the extract were then reviewed. Albumen and syntonine are absent. The latter remains after albumen is dissolved out, and is insoluble in water, but soluble in dilute acids. Myochrome, the coloring matter of muscles resembles hæmatin and, like it, contains iron. It is precipitated along with albumen during boiling. There is not much gelatin in the extract. It contains however, like beef tea, inosite, which is a sort of sugar, animal dextrine, creatine, creatinine, lactic and inosic acids. In short Dr. Thudichum considers it to be a sort of beef-tea solidified, possessing the same merits and liable to the same objections, with somewhat less of nutritive matter, Of the whole solid contents of meat, not more than one-eighth or one-fifth are retained in beef-tea or Liebig's extract of meat.

Narceine.—Clinical observations of the effects of a constituent of opium, known as *narceine* would lead us to believe that in this latter we have an article which will cause tranquil sleep, followed by pleasant waking and freedom from headache and stomach derangement, and not cause constipation. M. Eulenburg considers narceine to be superior for its sedative effects to all other substances. It is particularly serviceable in surgical cases, and may be used either internally or externally. In the former case, the dose is from a sixth to a half a grain of the hydro-chlorate of narceine in solution.

Pure Silver.—At a recent meeting of the California Academy of Natural Science, Mr. Gutzkow presented a sheet of chemically pure silver, three feet in diameter, three ounces in weight, and as thin as fine paper. The color was beautifully white, and tex-

ture like fine lace. This sheet was made by mixing solutions of protosulphate of iron and sulphate of silver in a large dish, and the silver rose to the surface, and there formed into a sheet. Successive sheets will rise with each stripping. This easy mode of obtaining chemically pure silver is of much practical value.

Catching Cold, says Dr. Thomas Inman, is a common phrase for an attack of catarrh, but it is a very incorrect one. One year I suffered so very severely from a series of "colds" that my attention was drawn especially to them. I was then lecturer on Medicine, and nearly every night from five o'clock to six during the winter months, had to turn out from a warm room to go through all weathers, lecture for an hour in a theatre heated by a stove and lighted by gas, and then return again to my snuggery at home. When I felt a fresh cold beginning, I tried in vain to account for it, until I accidentally saw in Copland's dictionary that the most fertile cause of a cold was coming from a moist, cold air to a hot and dry room. This at once explained to me the reason of my frequent suffering, for I had invariably gone into my hot room straight from the cold. I of course soon changed my habit: dawdled in the hall while taking off my great coat, perambulated in rooms which had no fire in, went up and down stairs and the like, ere I went into my study, whose temperature was also reduced. Since then, I agree with a friend who says, "that a cold comes from catching hot;" and I am disposed to think that there is a strong analogy between a chilblain on a child's toes and a cold in a person's nose, throat, and lungs.—*Medical Mirror.*

Probing Gun Shot Wounds.—From Dr. V. Gelcich of Los Angels, Cal., we have received a communication relative to the above subject which is worthy of notice. He says that there is much difficulty in discriminating between bone and ball by the use of the ordinary probe. His probe is simply a piece of white pine wood, made in the shape of a probe, introduced into the wound, rubbed against the suspected object, and quickly withdrawn, when, if it has touched the ball, traces of lead will be found upon

it. He says, by this simple instrument, while a medical officer in the United States Army, he saved the limbs of two men on whom amputation was about to be performed for gunshot wounds in the lower extremities; what was long supposed to be bone proving to be lead by the aid of the white pine probe.

A porcelain probe has been used to show the presence of lead in the same manner, but it is probable that a softer substance like wood is better. At least where the channel made by the ball is straight, or nearly so, and in many cases where a probe is not at hand, this, which could be extemporized from a bit of wood, would prove extremely valuable. In cases where the ball did not take a direct course, it seems as though a piece of pine wood might be secured to the metallic probe and do its office in a superior manner. Dr. Gelcich offers his discovery to the attention of surgeons.—*Sc. Amer.*

Necrosis of the Lower jaw in Makers of Lucifer Matches.—It has been comparatively only a few years since this peculiar disease has been known. Lorinser of Vienna first called attention to it in 1845. Numerous observations, however, have since been made, and the fact is as thoroughly established as any other.

It is remarkable that it is the lower jaw only which is first attacked, and indeed the upper jaw nearly always escapes, however prolonged the attack may be. So striking an exemption demands an explanation, and no theory of the origin of the disease can be accepted which does not account for this curious fact. Some have supposed that phosphorus has nothing to do with it; others that it is a sort of scrofula; others, again, that it is caused by the arsenic in the phosphorus; and still others that it is occasioned by the gas set free.

The probability is that the phosphoric vapour is absorbed and oxidized by the saliva, and thus applied to the bone, which it attacks and destroys. This view is corroborated by another remarkable fact. The disease does not readily occur while the teeth are sound. It would seem that decayed teeth allow the acid held in solution by the saliva to come in contact with the bone and to destroy it. This would account for the proneness of

the poison to attack the lower jaw, since that is the point which would naturally be more liable to suffer, on account of the gravitation of the poisoned saliva towards the floor of the mouth.

Trichiniasis.—The scavenger habits of the rat certainly render the contents of his entrails living poison to the viler animal that devours them, and thus a prolific source of trichinæ in swine. A committee of the Vienna Medical Society have made an elaborate report in which they maintain that the disease also originates in the rat; a large percentage of rats examined in different towns and countries having been found trichinized. It is also found that the germs of trichinæ may be conveyed from infected meat to other food by the larvæ of flies; which shows how a rat or other animal may become trichinized without eating either trichinized flesh or intestines containing germs. Prof. Brown, in a lecture before the Society for the advancement of Science and Art, in this city, stated that this parasite originates almost entirely in the swine, and is there invisible to the naked eye. When flesh containing the trichinæ is introduced into the human stomach, the flesh is dissolved and the parasite unloosed from its cell. When this occurs the parasite is about one-thirteenth of an inch in length. Birth is then given to trichinæ, which straightway proceed to penetrate the whole muscular and flesh system through the alimentary canal. These young trichinæ are at first only 1,540 of an inch in length, and resemble a worm in spiral coil. By the time they traverse the system, however, they increase in size many fold, and then begin to make felt that terrible disease to which they have given that name. As first introduced into the animal they cause trouble only by the production of their offspring. The disease is first made apparent by pains in the joints, the head, and the spine, and the patient gradually wastes away and dies. The trichinæ do not create disease by eating away the flesh—which they are not fitted to do—but by hindering or closing up the forces and processes by which health is preserved. From one of the limbs of a girl who had who had died in this manner lately in Springfield, Mass., a portion of muscle was detached and subjected to microscopic examination. A square inch of this disclosed from 30,000 to 80,000. trichinæ.

BOOK NOTICES.

Treatment of Fractures of the Lower Extremities by the use of the Anterior Suspensory Apparatus.—By N. R. Smith M. D., Professor of Surgery in the University of Maryland. Baltimore: Kelly & Piet, 1867.

No more valuable improvement in the Surgical treatment of fractures than Professor Smith's Anterior Splint has been made during this century. It has passed so generally into common use, that the rising generation of surgeons find it difficult to estimate the magnitude of this boon to suffering humanity. Those, however, who remember the torture of the old fracture-box and the straight splint, have better facilities for determining the value of this great improvement in the treatment of fractures of the thigh. They have seen a patient lying for weeks on his back, with a long straight splint reaching from his arm-pit to a point considerably below the sole of his foot, another on the inside stretching down from the perineum, with the foot strapped down to one and copious turns of bandage holding both firmly to the broken limb. The poor sufferer was a picture of immoveable wretchedness, his whole frame fixed as in some mediæval instrument of torture, and while he waited in rigid misery for the bones to knit, the constant pressure as he lay on his back gave him bed sores which, owing to the unchangeable position, it was impossible alike to avoid or successfully to treat. In addition to other troubles, the unspeakable weariness of the fixed attitude wore out the patient, and the weak sufferer died less of the accident than of the treatment.

With all this trouble Dr. Smith's apparatus enables us to dispense. The principles of treatment which have always been recognized are met in it by arrangements peculiarly comfortable to the patient, and new principles have been introduced which have added largely to the ease of the sufferer. Every one saw that it was necessary to bring the ends of the broken bone in apposition and to keep them there. It was well known that the main difficulty was the tendency of the trunk to sink down in the bed and thus to push the upper fragment past the lower and to shorten the limb. To meet the indications of treatment, the best mechanical contrivance was a long, straight immoveable splint which should serve as a point of attachment wherefrom to hold up the upper fragment and to draw down the lower.

Dr. Smith, however, conceived the happy idea of giving the patient a chance to change his position. His apparatus is too well known to every one who has studied surgery in Baltimore, to need a description for this latitude, but as we have readers at a distance to whom its details are not

familiar, we shall give them a brief outline of its construction and application. Its immovable portion consists of a single splint, with one angle at the ankle, another at the knee, and a third at the hip. It is made sometimes of wood, but preferably of wire. It must be long enough to stretch from the anterior spinous process of the ilium to an inch beyond the toes when the whole limb is extended. With the wire splint, the angles are easily modified to suit particular fractures. Another essential part of the apparatus is the suspensory band. This consists of a cord attached by either end to the splint, and supporting it from the thigh and the shin, and fixed by another cord to a pulley on the ceiling. The anterior splint is laid upon the limb, and made fast at the foot, the ankle, above and below the knee, and near the hip. The cord is then attached and the limb hoisted by means of the pulley. It is now easy to envelope limb and splint with a roller, which affords a support at once firm and easy. The patient lies comfortably in bed, shifting his position at will, without fear of disturbing the fragments; for extension and counter-extension being made by splint and cord, by regulating the direction of the suspension, no undue traction is made upon the limb, and no severe local pressure exists at any one portion of the limb. It is the most comfortable fracture apparatus in existence, and no surgeon who has once applied it will ever use any other. It is applicable to all fractures of the thigh and leg.

The book before us is a full and satisfactory description of this invaluable apparatus and the proper method of applying it. It is illustrated by a sufficient number of wood-cuts for a clear understanding of the subject. It contains furthermore reports of several cases in which the application of the splint and its results are described. The most striking of these is the summary of cases of compound comminuted fractures of the thigh produced by gunshot wounds, treated in the Confederate hospitals at Richmond, during the second year of the war. From this summary it appears that death inevitably followed every attempt to save the limb, except in those cases in which this suspensory apparatus was applied. Of these one half recovered. This simple statement speaks volumes for Professor Smith's method of treatment.

The publishers deserve much credit for the handsome style in which they have gotten up the book. It is elegantly printed on fine tinted paper and neatly bound in cloth.

EDITORIAL DEPARTMENT.

Journalism—When Scaliger had finished his Lexicon, worn out with his tedious task, and disgusted at the small reputation he could reasonably expect as a reward for such protracted and exhausting labor, he is said to have thrown down his pen and petulantly exclaimed that the dammed in Hell might have their punishment commuted to writing Diction-

aries, and not escape a single pang of all their endless torture. The great scholar lived before the days of periodicals, or he would have discovered that there was another literary task still more barren of reputation, still more thankless, still more wearisome than that which provoked his famous outburst of spleen.

The reader who languidly turns over the leaves of his periodical visitant and idly dabbles in a review here, or an editorial there, has little conception of the labor and anxiety which these lines he so lightly skims over have cost the editor. Criticism is easy compared with production, and it is liberally dispensed in proportion to its cheapness. It is amusing to see with what flippancy lucubrations, that were painfully produced with much thought and no little expenditure of midnight oil, are disposed of by the critic.

Now far be it from us to deprecate criticism. Whoever comes before the public is childish if he does not expect it, and incurably silly if he does not profit by it. A wholesome, sound criticism is the life of any literature. Nothing is more disgusting to any man who has a decent regard for his own reputation than indiscriminate and monotonous eulogy. That sort of thing may do for the "Mutual Admiration Society" or half-drunken after dinner speeches, when the orators looking at their friends through the ruddy wine, naturally enough, see them all *couleur de rose.* Every man is then the paragon in his own department, and every speaker finds that to be the proudest moment of his life.

By all means then let us have criticism, but let it avoid flippancy of blame as well as extravagance of praise. Let the censor consider a moment what the task of the editor is. In our own department for example, it is by no means a light one. We have to cater for a great variety of tastes, and to keep the public informed upon very many topics. The advance of several sciences, more or less connected with dentistry, is to be kept pace with. Variety is to be attained. One man is engaged in a particular pursuit and for the time cares for nothing except that. But another has something else in view which he pursues with equal singleness of purpose. The only way, to meet the wants of each then, is to attempt to furnish instruction for all. But even a journalist can claim no exemption from the law of space and time. He might be very glad to cover the whole circle of the science, in a single number, but his paper has a definite limit and his aspirations must be restricted to that. The impatient reader, who does not find what he wants in the first number upon which his eye happens to rest must have a little patience and he may find it in the next.

It is our desire to know the wants of our readers, and our intention to meet them. We therefore ask them to address us letters of inquiry in regard to any special subject they desire to see elucidated. It will afford us pleasure to enlighten them to the full extent of our ability. It is our intention to open a page, or more if necessary, to such correspondents and we invite communications.

Convention of Professors of the Medical Colleges.—From the following account of the proceedings of the Medical Convention, held last month in Cincinnati, it will be seen that the Medical Colleges are following the lead of the Dental Colleges in the effort to elevate the standard of Collegiate Education.

In pursuance of a call of a committee appointed by the American Medical Association, at its last session, held in Baltimore, May 3, 1866, delegates from most of the medical institutions of the country met in Cincinnati, in the faculty room of the Medical College of Ohio.

Professors Holloway, of Louisville; Davis, of Chicago; Donaldson, of Baltimore; Blackman, of Cincinnati; and March, of Albany, were appointed a committee to report on the order of the different subjects which were to occupy the attention of the Convention.

After which the Convention adjourned to 4 o'clock P. M.

In the afternoon session this committee reported the following distinct propositions for the consideration of the Convention.

"1. That every student applying for matriculation in a Medical College shall be required to show, either by satisfactory certificates or by a direct examination by a committee of the faculty, that he possesses a thorough knowledge of the common English branches of education, including the first series of mathematics, elements of natural science, and sufficient knowledge of Latin and Greek to understand the technical terms of the profession, and that the certificates presented or that the results of the examinations thus required, be regularly filed as a part of the records of each Medical College.

"2. That every medical student be required to study not only three full years, but also to attend three regular annual courses of Medical College instruction before being admitted to an examination for the degree of Doctor of Medicine.

"3. That the *minimum* duration of an annual lecture term, or course of medical college instruction, shall be five calendar months.

"4. That every medical College shall embrace in its curriculum at least thirteen professorships, including substantially the following branches, namely: Descriptive Anatomy, Physiology and Histology, Inorganic Chemistry, Materia Medica, Organic Chemistry, Toxicology, General Pathology and Public Hygiene, Surgical Anatomy and Operations of Surgery, Medical Jurisprudence, Medical Ethics, Practice of Medicine, Practice of Surgery, Obstetrics and Diseases of Women, Clinical Medicine and Clinical Surgery. That these several branches shall be divided into three groups or series, corresponding with the three years required for medical study: The first or freshmen series, shall embrace Descriptive Anatomy, Physiology and Histology, Inorganic Chemistry and Materia Medica. To these the attention of the student shall be mainly restricted during the first year of his studies, and on them he shall be thoroughly examined by the proper members of the faculty at the close of

his first course of Medical College instruction, and receive a certificate indicating the degree of his progress. The second or junior series, shall embrace: Organic Chemistry and Toxicology, General Pathology, Public Hygiene, Surgical Anatomy and Operations of Surgery, Medical Jurisprudence, and Medical Ethics. To these the attention of the medical student shall be directed during the second year of his studies, and on them he shall be examined at the close of his second course of Medical College instruction, the same as after the first. The third, or senior series, shall embrace Practical Medicine, Practical Surgery, Obstetrics and Diseases of Women, with Clinical Medicine and Clinical Surgery in hospital. These shall occupy the attention of the student during the third year of his medical studies, and at the close of the third course of Medical College attendance he shall undergo a general examination in all the departments, as a prerequisite for the degree of Doctor of Medicine.

"The instruction in the three series of branches is to be given simultaneously, and to continue throughout the whole of each annual college term; each student attending the lectures on such branches as belong to his period of progress in study, in the same manner as the Sophomore, Senior and Junior classes each pursue their respective studies simultaneously throughout the collegiate year, in all our literary colleges.

"5. That the practice of selling individual tickets by members of medical college faculties should be abolished, and, in the place of it, each student should be charged a specified sum for each annual course of medical college instruction; the sum being the same for each of the three courses before graduating: and any student or practitioner who has attended three full courses in any one college, shall be entitled to attend any subsequent course or courses in that college gratuitously. The fees paid for each annual course of college instruction should be paid to the Treasurer of the college, and subsequently distributed to each member of the Faculty at such time and in such proportion as the Trustees and Faculty of each college shall determine.

"6. That every Medical College should immediately adopt some effectual method of ascertaining the actual attendance of students upon its lectures, and other exercises, and at the close of each session of the attendance of the student a certificate, specifying the time and the courses of instruction actually attended should be given, and such certificate only should be received by other colleges as evidence of such attendance."

The resolutions were adopted. Professor Davis then introduced the following resolution:

"*Resolved*, That a committee of five be appointed by the President, whose duty it shall be to present the several propositions adopted by the convention to the trustees and faculties of all the medical colleges in this country and solicit their definite action thereon, with a view to the early and simultaneous practical adoption of the same throughout the whole country; and that the same committee be authorized to call another convention whenever deemed advisable."

The Chair appointed the following gentlemen that committee: Prof. Davis of Chicago, Donaldson of Baltimore, Gross of Philadelphia, March of Albany, Blackman of Cincinnati. Thereupon on motion of Professor Hammar, the convention adjourned subject to the call of the committee.

The Harris Lectures.—From the *Twenty-Eighth Annual Circular* of the Baltimore College of Dental Surgery, for the Session of 1867-68, just issued, it will be seen that the Faculty of this College have inaugurated a series of Lectures, to which they have given the name of their late distinguished President, and which they are confident will prove an important adjunct to the regular course, and very interesting to the Student.

The series will consist of twenty or thirty lectures, delivered on certain evenings throughout the session.

The subject of each lecture will be some point in Dental Surgery, or some specialty in Dental Mechanism, which the lecturer has made a particular subject of study.

Arrangements for the ensuing session are not yet completed, but a number of names of gentlemen are given, who have already kindly consented to assist in the work of Dental Education.

From the high character and position in the profession of the Lecturers, we anticipate an interesting and instructive series, and feel confident that this movement will contribute greatly to the benefit of both the student and the institution.

The Faculty propose in future circulars to give the names of the Lecturers, and the time, and subject of each lecture of the series.

Peculiarities of Dentition and Dental disease Hereditary.—In a paper by William Sedgwick, in the April number of the *British and Foreign Medico-Chirurgical Review*, we find some interesting statements in reference to this subject.

The author cites Dr. Montgomery's case of the two central incisors of the lower jaw projecting from the gum at birth in two children of the same mother. Dr. Whitehead records a similar peculiarity, two children and their mother having all three been born with the two lower incisors fully developed. Retardation, however, is more common. The author mentions a case, in his own experience, in which a little girl, aged fourteen months had not cut a tooth. The peculiarity was traced to a paternal grandmother, who, as well as her seven children, had not begun to cut teeth before attaining the fifteenth month. Four of these seven children, (three males and one female) grew up and married, and had amongst them five children, all of whom delayed cutting their teeth until after the first year.

A similar hereditary law governs occasionally the developement of caries. This disease attacked the upper incisors of five children in the

same family, commencing at the age of five years. The first born was a girl whose upper central incisors began to decay at the age of two years. Corresponding decay of the same teeth, at the same age, occurred in the second, third fifth and sixth children. The fourth child died at the age of fifteen months, too early for the developement of the disease, and the seventh was an infant four months old when the paper was written. This is certainly a very remarkable history, and it is impossible to avoid the conclusion, that the children inherited same sort of defect of these particular teeth, although their parents had sound front teeth, and no similar early caries was known to have occurred in the family.

An Interesting Relic.—Dr. Jas. F. Thompson of Fredericksburg, Va. has presented to the museum of the Baltimore College of Dental Surgery, an entire set of artificial teeth, made during the Colonial times of Virginia.

The teeth are carved from ivory, mounted on gold plates, and connected together by means of springs. That they have been long worn is evident from the number of times they have been rudely repaired, and they are especially interesting as showing the action of deleterious agents upon the ivory, a number of carious cavities existing in the different blocks, together with accumulations of salivary calculus.

Iowa State Dental Society.—Dr. H. S. Chase, the Corresponding Secretary of this Society, wishes us to announce that the next session will be held at Lyons, on Tuesday, July 9th, at 7½ o'clock, P. M. There will be a session of two whole days. Besides the appointed essayists, several distinguished Dentists are expected from abroad. From the reputation of the essayists and the subjects of the essays, this meeting will no doubt be an interesting one.

The members are requested to bring with them microscopical specimens of teeth; dental curiosities; new or improved instruments; casts of malformations, &c. Also, microscopes of 300 diameters and over.

Massachusetts Dental Society.—The Annual Meeting of this Society was held on the 23d of May at their Hall in Boston. The Annual address was delivered by Dr. Henry F. Bishop of Worcester. Clinics were held by Drs. E. N. Harris, G. T. Moffatt, S. J. McDougall, and T. B. Hitchcock.

Dr. Noel's Review of Dr. Arthur's Book on Decay of the Teeth.—We are sorry to announce to our readers, that owing to the great pressure on our columns, this article has been unavoidably crowded out. It shall certainly appear in our next.

BALTIMORE
COLLEGE OF DENTAL SURGERY.
TWENTY-EIGHTH ANNUAL SESSION.
1867-68.

FACULTY.

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RUSSELL MURDOCH, A. M. M. D., Prof. of Anatomy.
HENRY REGINALD NOEL, Prof. of Physiology.
HUGH McGINNIS GRANT, D. D. S., Demonstrator of Operative Dentistry.
THOMAS SOLLERS WATERS, D. D. S., Demonstrator of Mechanical Dentistry.
CLAUDE BAXLY, M. D., Demonstrator of Anatomy.

The TWENTY-EIGHTH Annual Session will commence on the FIFTEENTH of October, 1867, and close on the FIFTEENTH of March, 1868.

Lecture and Demonstration Fees - -	$115
Matriculation Fee (paid only once) -	5
Diploma Fee - - - - - - - - - -	30

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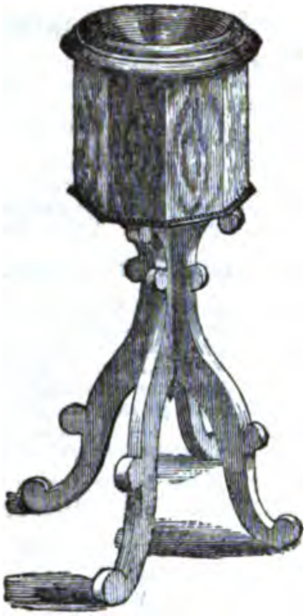

No. 2.

SPITTONS.

No. 1.—"A" is the standard to be attached to the lower part of the chair which remains firm when the upper part of the chair is thrown back. "B" is the ring attached by a strong bolt to the top of the standard on which it can be moved so as to throw the spittoon either towards the front or the back of the chair. "C" is the marble top. "D" the glass funnel, and "E" the bowl with which the funnel can be readily removed to be cleansed. The iron work is handsomely bronzed, and in every respect is very ornamental and very durable and convenient. PRICE $8.

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Heavy claret-colored glass spittoon funnels One Dollar each.

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The following discount will be allowed when teeth are purchased in quantities :

$25 or more	10 per cent.
50 "	15 "
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T. G. Armstrong & Son's fine Gold Foil	per oz.	$44 00
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" "	per single cake,	1 00

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Spittoons	"	8 00	" 20 00
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" " one "		5 50
" " two "	enclosed wheel	6 00
" " two "	" "	4 00
" " skeleton		2 50

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Brass bound Mahogany Case, one tray.........$30 00

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2 doz. Drills and Excavators to fit Socket.
1 pair upper molar Forceps.
1 " lower " "
1 " straight.
1 " roots.
2 Elevators.........$20 00

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Mallet, 1 point	$10 00
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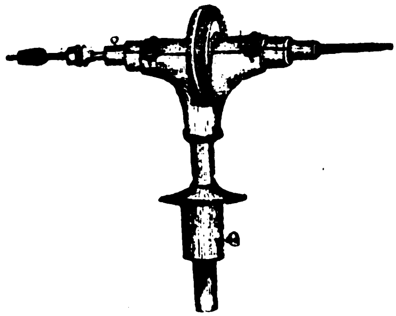

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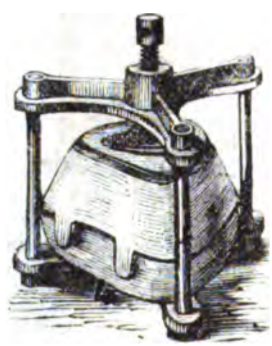

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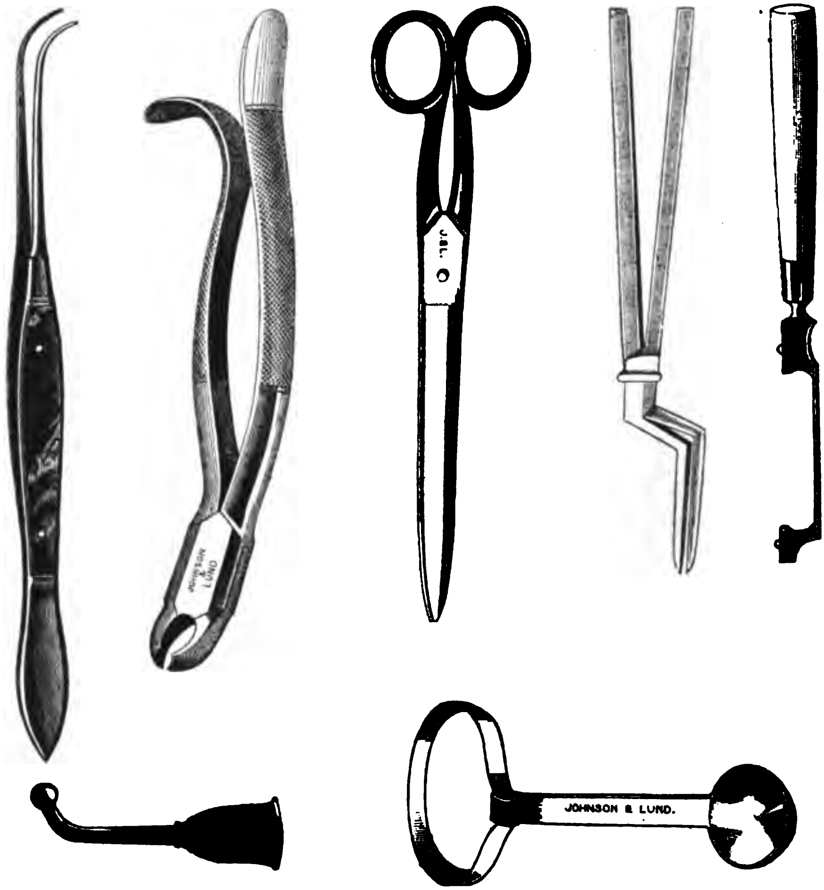
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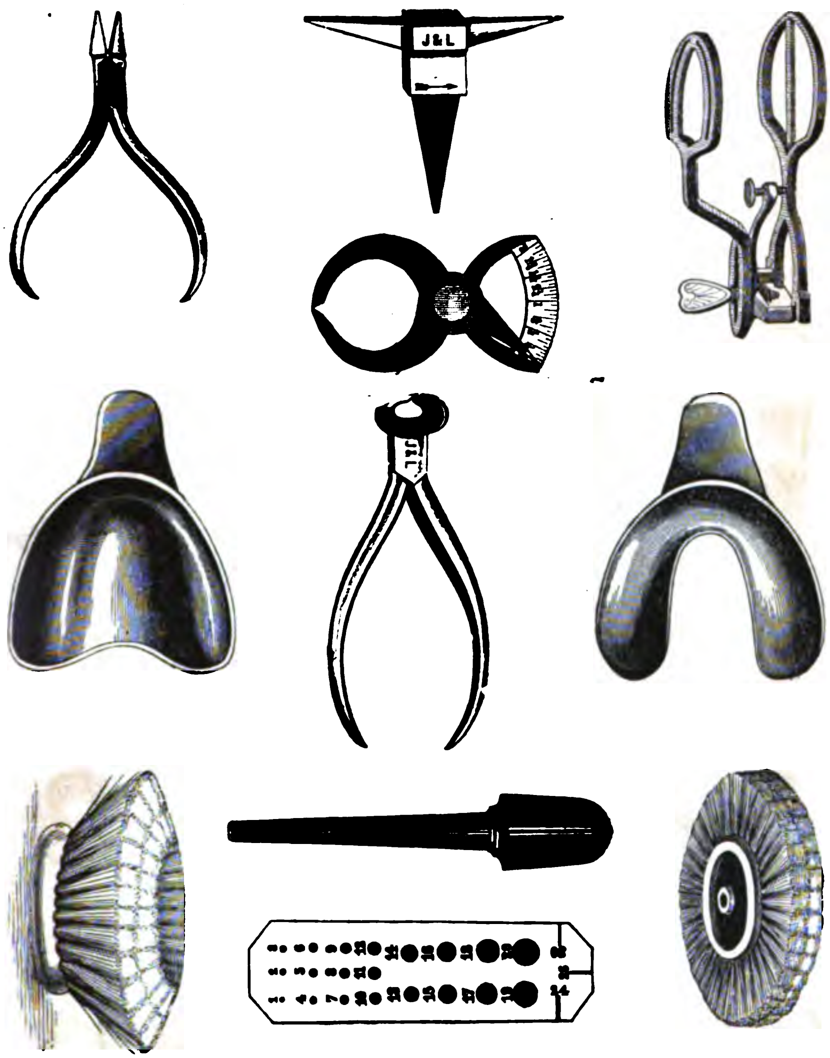
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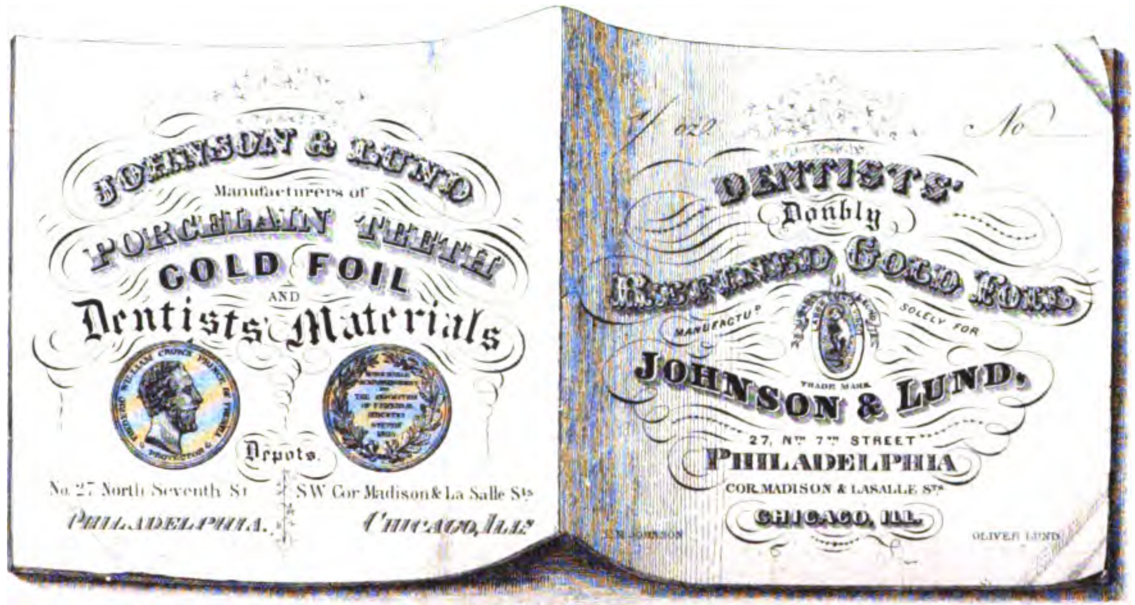

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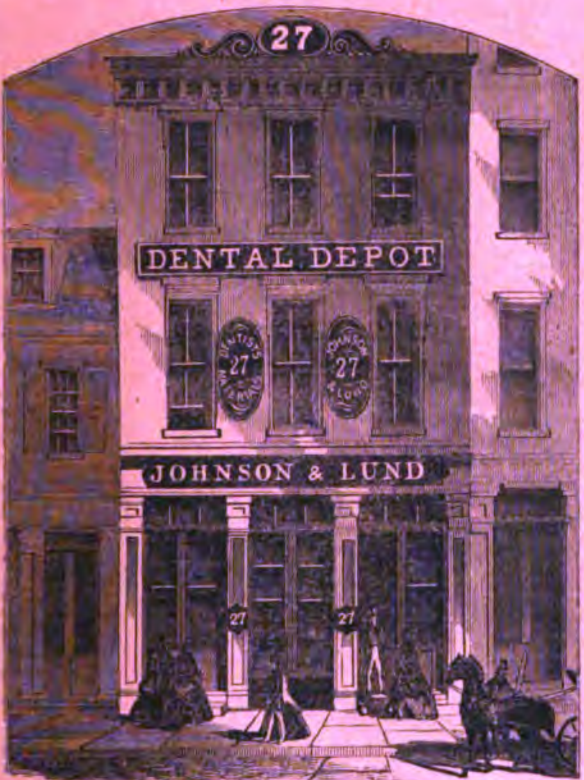

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THE
AMERICAN JOURNAL
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DENTAL SCIENCE.

Vol. I. THIRD SERIES.—JULY, 1867. No. 3

ORIGINAL COMMUNICATIONS.

ARTICLE I.

Facts and Philosophy of Dental Progress, No. 2.

By Professor Austen.

Progress in some direction is an essential condition of thought and action. In the individual its extent is necessarily limited: in art and science it is illimitable The place reached by the man of science is determined by his starting point, rate of progress and duration of life: but the science itself moves on from age to age and can only cease to grow, when all truth shall have been found out. When the finite mind can grasp the infinite, progress may end: until then we are like Newton, children handling pebbles on the shore of a boundless and fathomless ocean.

No art or science, dependent for its progress upon the exercise of observation, reason and skill, can truly be said at any time to be perfect—that is, incapable of further improvement. Yet we are constantly met with the statement, that this or that act or invention has been brought to a "state of absolute perfection." Some improvements are so great and rapid, and some discoveries are so astounding, that the mass of men may be perhaps excused for thinking that further progress in that direction is impos-

sible. But to the truly scientific, this wide space between the past and present gives the stronger presumption of a still wider unexplored interval between the present and future.

In arts which advance with such rapidity as dentistry, some will fall into this error and remaining content with the present, seem not to contribute their quota to progress. Others commit the greater error of constantly seeking after something new; neither acknowledging the value of past discovery, nor willing to test properly the discoveries of the present. The latter, rejoicing in the soubriquet of *Young America*, speak contemptuously of the former as *Old Fogeys*: not knowing that old fogeyism is the balance wheel, which gives steadiness of motion to their spasmodic impulses. In subsequent papers frequent instances will be given, where this conservative element has proved most valuable to dentistry. At no time is its influence demanded more than now, when so many practitioners seek to enlarge their business, less by doing an old thing well, than by always offering the "latest thing out."

Our *quarterlies* are replaced by *monthlies* for fear some new discovery should have a month's trial before its general adoption. Even the American Journal of Dental Science offers, in sacrifice to the insatiate craving for novelty, its dignity as a quarterly. This is *not* progress: the spirit of Young America is not progress. When our last quarterly expires for want of an "old fogey" subscriber, we may begin to date the decline of dentistry.

When I speak, therefore of the rapid progress of dentistry, and seek to learn its causes, I do not refer to that restless search after what is new, which misleads more than it benefits: but to those well-tried principles, methods and materials, which have added ten-fold to the power which is wielded by the skilful dentist; still more to the generous spirit which understands that in giving lies the true secret of receiving; also to an increasing acknowledge-

ment of the truth that collateral study is essential to a knowledge of any speciality.

FIRST, among the causes of the rapid progress of dentistry, I name EDUCATION. Men cannot improve what they do not understand; cannot understand what they do not study; and cannot study without opportunity and a certain degree of mental and physical aptitude. Education, in exact proportion to its completeness, increases the mental power, improves manual skill and gives the opportunity: cultivates habits of study and greatly enlarges the understanding. Thus education gives a man knowledge of the present status of his profession, teaches him its wants and strengthens those faculties, which he may use for its improvement.

A constant result of defective professional education is the waste of time and talent in overcoming difficulties already mastered. Hence, other things equal, that system of instruction is most perfect, which gives the most complete training and acquaints the student most thoroughly with what has already been done in his profession. Text books, journals, societies, colleges and office tuition, are the principal instruments of education. When dental journals, text-books, colleges and societies had no existence, office tuition was a very imperfect teacher: imparting doubtless much valuable instruction, but limited more or less to the experience of one man. It can now be made far more effective, because of facilities enjoyed by the teacher himself, for uniting with his student in profiting by the ideas and discoveries of others.

An association of teachers, having education as their chief aim, *should* be able to teach more effectively than the single practitioner, whose first concern is his practice, often so engrossing as to leave little time for much else. A college (or collection) of teachers, organized upon correct principles and faithful to their duty, may be regarded therefore, without disparagement to the system of office teaching which has always existed, as an important

advance in education, and hence a powerful agent in dental progress. But the five instruments of education are in truth inseparable and should work together. If I seem here to compare them, it is not to argue that some one is to be preferred, or some other excluded: but rather to show that dental education has largely added to and improved its instruments, and thus to account in part for that rapidity of progress, which is the present subject of inquiry.

The SECOND cause I shall name is at once a consequence of, and an aid to, education. I mean that spirit of liberality which must necessarily mark any body of men claiming to belong to one of the "liberal professions." So long as the spirit of secrecy, once universal, is practiced by any considerable number, progress is slow. The student may improve upon his preceptor's ideas and give in turn to his own students the benefit of a double experience. They may, by the aid of well-locked laboratories and better locked mouths, manage for a long time to reap the sole benefit of some valuable discovery. But what is the gain of the very best invention, compared with the immense loss which such professional selfishness, if universal, would entail. No where is the truth more forcibly shown than in Art and Science, that the freest giver is ever the largest receiver: for no single experience can prove as valuable as the united contributions of many minds.

The great truths of science are mastered by no one person, nor in any single age. Newton made use of the labors of Kepler and Copernicus: and succeeding minds, less great, have modified his theories and improved his inventions. It is thus that Art grows, each age beginning where the former left off; but under the rule of secrecy every period must work out first principles for itself and progress becomes impossible.

The old philosophers asserted that "Nature abhors a vacuum." Modern philosophers know that *science* abhors a *secret*. Science is knowledge, a secret is unknown: between them there is an "irrepressible conflict." Hence

the opprobrium resting upon the quack nostrum, possibly very good in itself. Secrecy is the essence of quackery, and the secret-keeping dentist is a charlatan, who in this age of "patents" is utterly without excuse for refusing to contribute his share towards the progress of his Art. Societies, journals and colleges have given great impetus to dentistry, by liberalizing the profession, and encouraging the free interchange of ideas.

The man who gratuitously imparts his discovery has a truly scientific unselfishness, and a catholic spirit worthy of high praise. We might wish all to do this, but can scarcely expect it. Nor, so long as men of science copyright the books in which they give to the world the result of their investigations, can they consistently object to the principle of *patent*-rights. Dentists at the present day are much annoyed with the multiplicity of patents and their management. There are many worthless patents and many dishonorable patentees, but the *right* to patent an invention is undeniable, and it *may* be done in a manner consistent with the interest of science. That it is not so done in dentistry is the fault, in part of the patentee, in part of the profession.

The originator of an invention or discovery is entitled to his reward. If he is content with the honor, the profession will not object to the form of payment. If he seeks a more substantial return, it becomes a matter of barter and subject, of course, to all the be-littling influences of trade. So long as members of any profession use ideas without acknowledgment; so long as they derive pecuniary benefit from inventions, and yet refuse pecuniary return to the inventor, so long will patents be a source of contention, materially injuring the *moral* status of that profession. But the injury to science and art is in one respect slight, because the *secret* is made "patent," and thus progress is not arrested.

The THIRD and last cause of the rapidity of Dental progress which I shall notice is found in its peculiarly

MECHANICAL character, which permits it to be so largely benefitted by the inventive spirit of the age. A man may be a good physician, yet not know one tool from another: a dentist is a mechanic, or he is nothing. The former may loose his right arm, yet write prescriptions with his left: the latter must have two skillful hands, and know when and where to use them. The Surgeon may be a poor judge of painting and a worse critic in culpture, but the Dentist, who has no æsthetic faculty and is wanting in the ability to appreciate works of art, lacks a most important element of dental character.

Dentistry in its progress, benefits by all those discoveries in science which have done so much for medicine and surgery, but it has moved faster than they, by virtue of this artistic element, which is its distinguishing characteristic, as one of the healing arts. So far, then, from undervaluing this element, or keeping it in the back ground, as some very strangely seek to do, I would place before you MECHANICAL SKILL—skill in the use of instruments—as absolutely essential in every practical application of dental science. I would have you understand that, whilst you may and should possess knowledge and abilities which can make you good surgeons and physicians, unless you possess something more, you cannot become good dentists. I would not in this wish to be considered as placing dentistry above its sister arts, I simply state that it requires something which they do not—and it is that which constitutes the "*differentia*" of Dental Science.

These specific requirements involve physical and mental qualities far from common, hence and because of defective education, a large proportion of incompetent dentists. Hence so few, comparatively, attain eminence in this profession. Hence again, the great necessity for a judicious selection of students, and a careful examination of candidates for practice. For there are many whom no amount of training can qualify for the practical application of their art, however learned in its science.

In a series of papers on Dental Education, I propose to consider more at length the two first causes here assigned, of rapid progress in dentistry. In the remaining papers of this series, I shall confine the inquiry to the third and last cause—the mechanical or artistic element. I shall briefly review the several instances of progress, without, however, entering into a full description of the details of the various processes, for my object is not to write a practical treatise on mechanism: this must be left for another place. But I shall, I think, render you a good service, if I give you a correct view of the improvements in dental art.

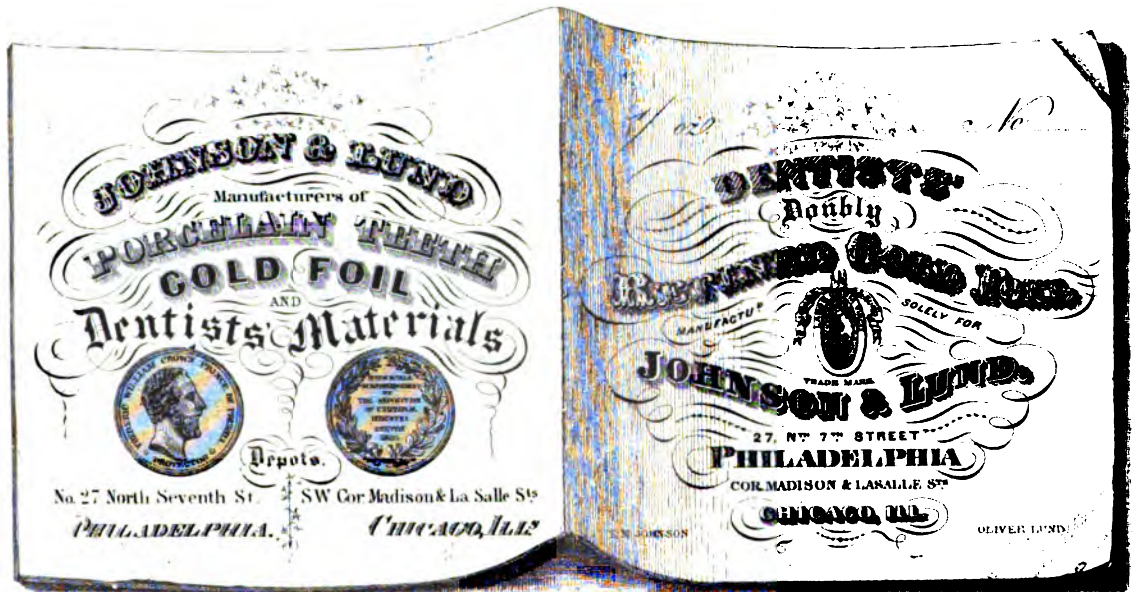
I may, perchance, wound the conceit of Young America by telling him that he deserves no credit for doing some things better than his old preceptor. I may may vex him by advising a return to some relic of old fogeyism, I may even enrage him by intimating that in his haste to improve he has at times made worse, or venturing to hint that two years test of his pet practice is less convincing than twenty years test of a method he could not or would not learn. I shall hope, however, to give evidence of progress, sufficient to make every student or young practitioner rejoice that he is not called upon to battle with the difficulties and deficiencies of Dental Science as it once was.

ARTICLE II.

Treatment of Pulpless Teeth.

By Professor J. Smith Dodge, Jr., M. D., D.D.S., of the New York College of Dentistry.

When a man openly advocates heresy, it behooves him to look well to his proofs. The following paper, therefore, will deal much more largely with reasons for the practice it advocates, than with the details of that practice. For, however dentists may differ about the proper treatment of teeth in which the pulp is dead, they pretty thoroughly har-



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quite sure of my position; and the result is uniform. No explanation can be given except that in the latter case the pulp-canal is converted into a syringe, with the broach for its piston; and the air in the root is forced out through the foramen, transmitting to the periosteum the pressure it has received. These facts seem to prove that any force applied to the contents of the pulp-cavity, whether they be liquid or gaseous, may have the effect of extruding a portion of those contents from the root.

Let us consider, in the next place, how this force may be applied to the decomposed pulp. When the pulp of a tooth has been poisoned, and the cavity of decay immediately filled without removing the dead matter within; or when the pulp has died after the external cavity had been closed by filling; an interval of quiet elapses before the symptoms of periosteal inflammation begin. If we open the pulp-cavity, we find that this interval has been sufficient for the disintegration of the pulp, which is removed as a semi-solid or fluid mass; in a word it has putrefied. Now the process of putrefaction is accompanied by a liberation of gases, more or less copious and rapid; and if we conceive the closed pulp-cavity filled with a poisonous fluid mass continually generating gases within itself, we have quite a sufficient agency for the forcing out through the foramen at the apex, of decomposed and poisonous matter. The chemist produces the extreme results of pressure by the evolution of gas within closed vessels.

Nor is this position merely the result of reasoning. Who has not heard his patient express immediate sense of relief, when he cut into the pulp-chamber of a tooth in the first stages of alveolar abcess? And even when the disease has made some progress, so that the tooth is sore and the jaw swollen, great relief is often afforded by drilling a hole either through the filling or through the neck of the tooth, into the pulp-chamber. Facts of this kind show that the process of decomposition in the pulp does produce a sufficient volume of gas to press injuriously through the

terminal foramen, upon the tissues surrounding the root. And I believe this, and no other, to be the method by which the decomposing remains of a dead pulp cause alveolar abcess, when they are left undisturbed within the tooth.

But they are not always left undisturbed. Indeed, it sometimes seems as if they might better have been; for, as has been said, abcess often follows promptly after the removal of a fetid pulp, where no sign of disease had previously appeared. And this I think may fairly be laid to the dentist's charge. As the plan of treatment which I am about to propose depends on this conviction, the reader will please give especial attention to this point.

It has been shown that a broach wound with cotton may convert the canal of the root into a tiny syringe, and inject into the periosteum any liquid matter contained in that canal. Suppose now, the root to have been scraped out as thoroughly as is possible, after the pulp has decomposed, and yet a minute drop of fluid to remain in the fine extremity of the canal. The least compression of the air within the tooth must force this drop outward, and inoculate the parts adjacent with a powerful animal poison. I have even seen part of the fine cuttings made by a broach enlarging the canal, forced through the foramen, in a tooth held in the hand to test this point. Of course the compact filling of the pulp-cavity with any material introduced by gradual pressure, must have the same result of ejecting any fluid remaining in the root; and when we remember how often the extremity of the canal is contracted to a capillary size which nothing except a smooth hair-like broach can penetrate, we shall not doubt that the utmost care in cleaning must often leave a small drop of liquid untouched, and I cannot see how the ordinary process can fail to force this out of the foramen. Believing that this occurs frequently, and that it explains many provoking cases of abcess, I have abandoned entirely the filling of roots, and adopted the following rules for my practice.

I. The remains of the pulp must be removed to the

utmost possible extent. Mine is no plan for saving labor, and whatever means can effectually remove all decomposed matter, must be used; provided always they cause no pressure toward the extremity of the roots.

II. When the pulp-cavity is entirely emptied of all organic matter, the cavity of decay, *and that alone*, is to be filled as usual. When it is necessary, to make fast the plug, I carry my filling into the pulp-chamber, but I always prefer to feel, on finishing the operation, that this contains only air.

III. It is absurd to claim that the whole pulp can always be removed. In the roots of molars and sometimes in bicuspids, the position of the decayed cavity or the shape of the canals may compel us to leave considerable portions of dead animal matter. In these cases, I put creosote into the pulp-chamber if I judge it can fairly reach these remains; but I do not force it into the canals. Still, I have but little confidence in the mass becoming so saturated with the antiseptic as to resist putrefaction; and my reliance, in such cases, is on quite another measure. I look forward to the time when this little portion of pulp will begin to ferment and produce gas, and by its pressure force out of the terminal foramen a poisonous drop. The most straightforward means of avoiding this result, seems to be to make a vent by which the accumulating gas may escape more easily than through the pulp-canal of the root. Accordingly, whenever some part of the pulp is unavoidably left within the tooth, I "ventilate" it at the time of filling. It is important to state how this is done. The drill must have a very obtuse V-shape at the point, and be sharpened on both sides. Its cutting end must be a little wider than the shank; and the latter long and flexible. The hole must not be larger than the wire of a medium-sized pin. The dentist must have learned by examination the relative position of the pulp-chamber in various teeth; and then passing the point of the drill under the free edge of the gum, until it strikes the neck of the tooth beyond the

enamel, he can so incline the instrument as to hit the cavity with certainty. It takes some time to perforate the thick wall, and the operator must not be satisfied until he feels the drill plunge suddenly into a vacant space. I do this before filling the tooth; when, if there be any doubt, the perfection of the ventilation can be tested. The gum falls as a curtain over this tiny hole, acting like a valve opening outward.

This operation is not new, but I think no one has explained its necessity, or given the results of long experiment with it until now. I have used it in certain cases for six or seven years, and lately as my regular practice in the cases indicated; and its success is complete. I have never seen the hole, made as directed above, show the least tendency to decay; and I cannot recall a single case in which a tooth treated in this way, and healthy at the time of operating, became affected with abcess afterwards. In one case, some years ago, I extracted a tooth which seemed to have been ventilated and yet had a troublesome abcess, but on breaking it open I found that the drill had not reached the pulp-chamber. Besides, I have known a good many teeth, painful and sore after filling, threatening alveolar abcess, which were relieved by the simple use of the drill, and remained quiet for years. Only a short time ago I saw such a case of seven years' standing, still doing excellent service.

Some readers will laugh at this, and some will rail. But to those who can still learn it is offered as an improved practice, based on sound reasons, and justified by long experience.

ARTICLE III.

Nature and Treatment of Decay of the Teeth.

A Review of Dr. Arthur's Monograph on Decay of the Teeth. By Professor H. R. Noel.

We have read, and propose to review this work, as it is eminently practical and addressed to the public, as well as to the profession. The subject is one of the utmost moment, and the earnestness of firmly settled

conviction marks the entire article. The author does not claim originality, but the practical importance is urged, and he brings to bear upon the question the results of 26 years of careful study and thoughtful experience.

The one idea, upon which the monograph is based, the one idea importunately urged upon the public and the profession is the

THE PROPHYLACTIC TREATMENT OF DECAY.

These are not the words of the author, but they embody his idea.

From the very nature of ordinary treatment, when necessarily resorted to in common practice; the fatigue, annoyance, pain, &c., under the hands of the operator; the reminiscences of shooting pains and swollen faces; the agony of sleepless nights, we instinctively turn to the study of Prophylaxis, as agreeable and cheering at least to the patient, if not to the practitioner. Filing, separating, &c., are carefully considered, and their value placed far higher than is generally acknowledged.

The views, ideas, experiences, &c., of the author can be partially expressed by a series of propositions, embracing the leading points.

I.—"If decay, existing upon teeth in contact be removed by file or otherwise, and the teeth permanently separated, the decay will not return unless in cases of extreme predisposition to decay, or extreme negligence in care of the teeth."

II.—"That if decay occur on the surfaces in contact of the incisor teeth of a child before it is twelve years old, all the teeth, with the exception in most cases of the incisor teeth of the lower jaw, will decay sooner or later at the same places, (i e. "points of contact.") This rule may not be absolutely invariable, but the exceptions are rare."—(Page 48.)

III.—"That this is the whole explanation of decay of teeth: they are made up of a substance capable of being decomposed by acids, which either exist or are formed in the mouth, but so feeble in power as to require to be retained for some time in contact with them to produce the effect which is called decay."—(Page 13.)

IV.—"At and near the points where the contiguous teeth touch each other, the secretions of the mouth are, at all times held in contact with the enamel. Particles of food are frequently forced between them, and remain until they are entirely decomposed. In this manner, such agents capable of destroying the enamel, as may be present in the mouth, are held in contact with the part of the tooth designated, as effectually as if the enamel were defective."

V.—"In order to prevent the entire loss of the teeth, the decomposed parts must be removed, and the affected surfaces left in such a condition as not to afford lodgement to the food, or to the secretions of the mouth."—(Page 20.)

VI.—"There is but one way in which this can be accomplished; the surfaces of the teeth on which the decomposed spots appear, must be cut away so that they cannot again come in contact."—(Page 26.)

VII.—"After cutting, filing, &c., a change takes place in the structure of the dentine, when left exposed, which in time renders it quite as capable of resisting attacks of decay as the enamel itself."—(Page 33.)

VIII.—"But the most important reason that can be urged in favor of the treatment proposed is, that by its means the teeth are more certainly preserved, than by filling them with any substance now known."—(Page 37.)

IX.—"An inevitable deduction of the author's from the above propositions is "that in all cases coming under proposition No. II., the separation of the teeth before puberty at least, is the true method of treatment; and saves pain, annoyance and expense while the teeth are preserved."

Such are the leading points advanced; these will be developed and others introduced as we proceed. The style of the work is plain, clear, inviting; no ambiguity of either ideas or expressions; no attempt at a learned disquisition, but a practical essay intended for the popular mind and so adapted. We propose first to examine filing, cutting, &c., in the light of some of our best authorities, and then review the work more closely.

As is evident, the author is a strong advocate of this measure, let us see what writers support his view.

Dr. H. H. Hayden practiced this over half a century ago, and in many instances these patients have passed recently under the author's notice, and he has carefully examined them; many of them now living in Baltimore, still retain traces of the file, and the work has faithfully stood the test of time. Prof. C. A. Harris in his Principles and Practice of Dental Surgery, most cordially endorses a paper by his brother, Dr. Jno. Harris; the paper was published in the September No. of Vol. V. of the American Journal of Dental Science, and from which we make quotations.

"That an experience obtained from 23 years of constant practice has fully convinced me, not only of the propriety but of the absolute necessity in the treatment of caries of the lateral surfaces of the teeth, of employing the file."

Again, and in forcible language, Dr. Jno. Harris gives us the following

"The principal, and I believe only objection, urged against filing teeth is based upon the *erroneous belief*, that the loss of any part of the enamel of these organs must necessarily result in their destruction. Why do the negroes of Abyssinia and Brahmins of India have such fine teeth, since it is well known they file their front teeth to sharp points, removing of course both enamel and dentine to some considerable extent? Yet travellers often speak of their fine teeth."

Mr. Jno. Tomes in his Dental Surgery, also approves of filing, cutting, &c., though he cautions against leaving a rough surface. Upon page 381, he makes the following statement:

In treatment of simple caries two methods are employed. The removal of the diseased, together with the surrounding healthy tissue, so such an extent as to leave a perfectly smooth surface constitutes one method."

It is therefore one of the acknowledged methods of treating caries Again page 383:

"Nature sometimes performs for herself an operation analogous to filing, when properly performed, both as regards its physical peculiarity and its results. The walls of a broad but shallow cavity produced by caries break down, the softened tissues are exposed to friction, and rubbed away, till at last the hard dentine is reached; this *becomes highly polished and endures for an indefinite time unaltered.*"

The filing therefore is endorsed. He mentions the same change in the Dentine, that our author also mentions; a condensing and hardening.

We have, therefore, Drs. Hayden, J. and C. A. Harris and Mr. Tomes in favor of this treatment. The question then is, not its use but the extent of its use; not is this a valuable and an allowable method, but to what extent can this be practiced? Have the members of the profession, as yet, fully appreciated the true value of this practice.

By filing, we do not intend simply the use of the file only—but include all instruments used for the purpose of removing superficial caries from, and separation of, teeth in approximation. The term filing, is therefore more of a representative word, adopted for convenience. A discussion might arise here, as to the theoretical and practical value of enamel, the two not being identical by any means; this we pass over for the present, as we shall other questions such as—What is the essential nature of caries? Does it always commence upon the exterior? Is caries ever found in the internal structure of a tooth, without an opening leading to the interior from the exterior, and by which said opening the fluids of the mouth gain access to the cavity, and by which said fluids this cavity was itself formed? Can caries be produced by interstitial death of either dentine or enamel? Do enamel and dentine possess enough of vitality, normally, to warrant us in applying the phrase interstitial death to them? Are dentine and enamel truly vitalized structures? Do they undergo waste and repair? Are they liable to any changes after being once developed, and if so—to what extent are they liable and what is the nature of the changes? These are questions yet to be solved, and a future article will be devoted to them. Their discussion in full, would be out of place in the hurried review we are making, and only when they bear upon the subject directly in hand, shall we again notice them, and then in as concise a manner as possible. The lengthy discussion must be reserved for a future article, when we shall endeavor to develope the physiological phase of the subject.

We proceed to a more thorough examination of the monograph.

The first chapter, embracing some eight or nine pages, contains the generally received opinions upon the anatomy of the teeth. The author is concise and clear, and the whole chapter given in a form likely to be popular with the general reader. Upon this we make no comments, as none are required at present.

Chapter II. is upon "Decay of Teeth," embracing also some eight or nine pages, and may be summed up in a condensed form as follows:

The cause of decay is an acid acting slowly but continuously upon the enamel. The mucous secretion of the mouth is acid, the saliva is alkaline, therefore neutralizing to a certain extent; but defective enamel and contiguous teeth may retain the acid mucus long enough to corrode and destroy the organs. Particles of food lodging between the teeth and decomposing, produce the same result, hence the frequency of caries at these points. Defective enamel and contiguity of teeth are predisposing

causes. The intimate structure of the teeth has also an influence; predominance of mineral element giving hard, firm, dense, compact teeth little liable to decay; a comparative deficiency of this element gives a softer structure more liable to decay.

The author classifies the predisposing causes of this latter condition as follows:

1st—"Hereditary condition of the system, in which all the tissues of the body, are more or less imperfectly formed."

2nd—"Although the general condition of the system may be apparently good, the structure of the teeth may be imperfect, as a consequence of some hereditary defect."

3rd—"They may be defective in structure in consequence of some disordered condition of the system at the time of their formation.

The author's remarks here, are plain, simple and pointed, leading the reader to the conclusion that a critical inspection of the teeth and an accurate examination of all collateral facts as to the history of the patient are very important, and go far towards determining the prognosis and modifying the treatment of the case.

Frequent and rigid examinations of the teeth are absolutely necessary, to justly appreciate their condition and to treat them in a scientific manner. The acid found in the mouth, and by which the teeth are supposed to be corroded, may not always proceed from the mucous secretions. Amylaceous or starchy materials, as food, are transformed by the action of the saliva (at temperature 100°), 1st dextrine and glucose, 2d lactic acid resulting.

Animal matter retained between the teeth, may under the influence of the temperature and secretions of the mouth, undergo a species of chemical decomposition, giving an acid, possibly lactic, as one product.

The frequency and rapidity of decay where teeth approximate, is therefore easily explained, and the means of prevention suggested.

The secretions of the mouth, especially if rendered abnormal by any vice of the system; the different kinds of food, by decomposition of which an acid may be produced, are therefore directly or indirectly causes, predisposing, of caries. Dr. C. A. Harris, in his work quoted from above, emphatically denies that caries ever commences first in the internal structure of a tooth, unless there exist a fracture in the enamel by which the secretions of the mouth can have access to the dentine. Upon page 248 he states, "it (caries) usually commences or occurs on the outer surface of the dentine of the crown under the enamel." And explains it upon page 260 as follows: "And in the proximal sides of the teeth where the outer covering is so fractured by pressure of the organs against each other, that the juices of the mouth find ready access to the subjacent dental tissue."

We do not fully endorse either statement, and consider the fracturing at least, to be but exceptionally present. If decay occur under the enamel at all first, it is from the porous, defective nature of the enamel

and not from fracturing. The enamel is more slowly, the dentine more rapidly destroyed by the agents, hence defective enamel may give only very minute carious canals as means of access to the dentine, but the dentine once reached by the fluids of the mouth, the decay spreads more rapidly and assumes a more definite character. Hence, a very minute carious opening precedes in the enamel, extensive lesion in the dentine. The one point here, is this, "decay always commences upon the exterior."

Dr. Harris speaking of artificial teeth decaying, (i. e. natural teeth, bone or ivory,) as do the natural undetached teeth, says, "and the decayed part in one, exhibits about the same characteristics as in the other." —(Page 259.)

We commend this statement to the notice and calm thought of the profession, as if it should be true absolutely, it is the death-blow of the vital theory of decay and equally so of the theory of circulation of blood itself in dentine. We are not fully prepared to give a decided opinion here, but we accept this as being comparatively true, not absolutely so. These are points for us to determine.

1st.—Artificial decay—is the process like the decay of the natural teeth?

2nd.—Does decay invariably begin upon the exterior?

3rd.—Does decay ever return in an accurately filled cavity?

Dr. L. S. Beale in his Structure, Life and Growth, pages—194—5 gives us the following:

"A dead tooth may remain for years, perhaps firmly fixed in the socket, and it has recently been proved by the highly interesting researches of Dr. Mitscherlich that teeth which have been removed from the body, even for years, may be fixed in the alveolus of a living person, and be retained there for a long period. In this case the tooth is not renourished, but remains as lifeless as it was before. It appears that by the agency of some cells of the periodontal membrane remaining in the socket, little cavities are formed upon the surface of the old cementum and dentine, and that afterwards new cementum is produced as a counterpart, and thus the dead tooth is firmly held in its place."

Dr. Mitscherlich's paper, which contains many things of physiological interest, has been translated and published in Truman's Archives of Dentistry, No. II.

This is a strong statement and we confess to an urgent desire *to see these teeth* thus placed and forming adhesions. We would be glad to have the phenomena of decay in these teeth accurately noted and compared with the *live* teeth decaying—the phenomena in each case accurately and scientifically noted; a sort of differential diagnosis made, if there be any points of difference upon which to found such a diagnosis. Will some of the profession please try the experiment and mark the results. For by this means a great deal of light could be thrown upon the subject.

Chapter III.—"Treatment of Decay of Teeth."

Here our author following logically his theory of decay, urges the ne-

cessity of removing as far as practicable every irregularity, depression, fissure, &c., that the fluids of the mouth and particles of food may find no place of deposit; a smooth polished surface is the great desideratum, and if this can be obtained without fillings, it is well; but if not, then filling must be resorted to, and both fillings and surrounding edges of cavity finished off with the highest possible polish.

Attention to the first permanent molars is enjoined.

"The teeth which soonest decay from defects of enamel, are the first permanent molars."—(Page 19.)

"There is scarcely a child of the present day who does not lose these teeth unless they are plugged soon after they come."—(Page 20.)

This is also a strong statement, and of course the more important as it refers to the early years of life, when the parents and professional adviser are strictly accountable for the proper attention to the teeth. The extraction of these teeth is not advised, except in a very few instances; when the teeth are crowded preference should be given the molar and one of the bicuspids extracted "as these teeth are of less importance, and are more commonly lost, even after the extraction of the first molars, than any others."

"The idea of placing a child six or seven years of age, in the hands of a dentist, seems to shock the sensibilities of many persons; but it should always be remembered that the true method of avoiding painful operations on the teeth, is to give them attention as soon as the slightest evidence of decay is detected."—(Page 22.)

The question is one of interest and we unhesitatingly advocate the author's view; early attention may cause pain and suffering to a mere child, but the advantage is one too great to be casually passed over, for delay but increases the certainty of pain, its degree and intensity, while the teeth are jeopardized.

(To be Continued.)

ARTICLE IV.

Dentistry as a "Fine Art." No. 2.

By Norman W. Kingsley, Professor of Dental Art and Mechanism, in the New York College of Dentistry.

If Dentistry as we have claimed in a former article is a speciality of one of the Fine Arts, it must be subject to the same general rules.

We will endeavor to make this application, and in so doing shall quote to some extent from authors upon Art: showing that for such purposes, all rules that govern the

Fine Arts are not limited in their application to one of its forms, but that everything that relates to ideality—the distinguishing characteristic of a fine art—is equally applicable to all, only in a different degree.*

Dentistry as an art, we have stated is but a department of Sculpture.

A more intimate acquaintance with this, its parent, will will both interest and instruct us.

There is probably a more prevalent ignorance of the Mechanism of Sculpture than of that of any other art.

In Poetry, Music and Painting, any mind of ordinary cultivation has a tolerably correct idea of the means whereby the end is accomplished.

In Painting, the knowledge that a sketch is made, and the colors laid on with a brush and harmonized and blended until the effect is produced, comes almost intuitively at the first sight of the result. But in Sculpture the general knowledge of the means employed to accomplish the end, is exceedingly crude. The respect for the art, very often consists in an astonishment at the labor that must have been spent in cutting the marble, and the difficulty that must have attended the production of such delicate forms from such adverse material.

It is but a short time since that in an essay which was read before a Western Dental Society, the writer used for an illustration a reference to the art of Sculpture, which conveyed the prevailing impression that the ideal of the artist existed in his mind until by repeated strokes with hammer and chisel, and weary months of labor in waiting and watching, he was at last rewarded by seeing slowly emerge from its rock-bound covering, the ideal of his imagination.

The illustration was very pleasingly worded, and probably, on the majority of his hearers, made the same impression as if it had been true. Let us visit a sculptor's studio

*No attempt will be made to give the names of authors, as in many instances the names are unknown to the writer.

and become acquainted with his machinery and *modus operandi*.

What do we find? A plain and not altogether cheerful apartment, with coarse walls of a neutral tint; a window high up with a northern exposure, the light falling on the objects below at an angle varying more or less from 45 degrees; a tub full of moist clay—common, ordinary *earthy clay:* half a dozen sticks of different forms, the size of a pen-holder, and—that is all.

This is the sum total of an artist's requisites, no hammers, chisels, machinery or marble; all *that* belongs to the stone-cutter's trade, and not to the artist.

With these simple appliances he produces those works which have astonished and will astonish the world until the end of time.*

Out of the plastic clay he fashions with skillful and nimble fingers the form that has dwelt in his imagination, not by wearisome days of labor with still more wearisome nights of waiting to see the result, but with a rapidity surpassing description does the soft and pliant clay yield to his magic touch, and out of a shapeless mass in a single day often, will appear form and comeliness.

Now with a servant so willing to obey his mandates is he able to fix almost immediately, the thoughts that have cost him months of preparation.

Every effort of the brain in the production of a statue is spent upon this clay model. It is this which he studies, and as he knows that *every variation of the form changes the expression*, and *that expression is the key to the character*, so does he bend with all earnestness to every detail; building up here and depressing there, swelling out this muscle and

*It is also a very prevalent error that the production of a portrait bust is the result of a cast taken of the face.

While such casts are sometimes taken of deceased persons, no true artist makes any further use of them than as works of reference.

Usually the bust is modeled in the clay from sittings, and no plaster or other material comes in contact with the face.

relaxing that, until in satisfaction his work is consummated.

This model in clay is the end of the *artist's* labor, and the *end* in more senses than one it might be said, as the very next step of the process involves its destruction.

The mechanic now takes it out of his hands, and every succeeding operation until it appears the finished marble is only one of mechanism. First then comes the moulder in plaster, and this exquisite image of the artist's creation, beautiful and life-like to dwell upon even in the clay, is by him buried out of sight in a winding sheet of plaster; and in its removal from this mould it is destroyed; while in its stead, ultimately, appears a duplicate, in dead and lifeless plaster.

No one who has not admired the original as it left the artist's hands, full of the warmth of nature which only the clay can give, and then seen substituted for it this cold and inanimate body, can fully realize Thornwalsden's charming simile:

"The clay represents the Life, the plaster the Death, and the marble the Resurrection." And this resurrection is indeed that of a glorified body; in form, a copy of the original, but in appearance not of the earth, earthy: and all these successive steps are purely mechanical.

The cutter of stone, with chisel, callipers and compasses, by taking careful measurements, will accomplish the whole to perfection, even adding to its beauty, in finish, without the brain to conceive a single portion of it.

Let us analyze the knowledge, and the education necessary to acquire it, which so remarkably distinguishes here the artist from the mechanic.

The true artist "is distinguished not so much by uncommon powers of mind, as by an uncommon combination of powers designated by the name of genius; free imagination, fine sentiment, both moral and intellectual, clear discrimination, philosophical reasoning, and sound judgement, are all essential to the best productions of ideal art.

With imagination, perception, and judgment, an artist may produce works of a high order, but if his mind is deficient in philosophical power, he can be neither a great poet, painter or sculptor, for true philosophy is the foundation of all art."

There must also exist a love for and an appreciation of the creations of the Divine Artist, and an enthusiasm in the contemplation of them.

The seed of this love is born in the man, its full developement is the result of cultivation.

No man can ever hope to excel in any art for which he has no love, his labor will degenerate into drudgery, and his enthusiasm into disgust. But it is not alone the possession of natural talents, cultivated tastes or enthusiastic love, which brings success.

The acquisition of much scientific knowledge is also essential. The Sculptor and Painter must "understand the Science of Anatomy, or he cannot represent his forms correctly; the Science of optics, on which depends his light and shade, perspective and color, the Science of mathematics, or he cannot apply these laws—the Science of chemistry, that he may know the nature of his materials.

"He must also understand the laws of gravity,—the laws of harmony and beauty—the laws of expression, both in countenance and attitude; and finally the laws of the human mind, to which his work is addressed."

"In addition to these specific acquirements he must have an extensive general knowledge, and a skill of hand acquired only by years of practice. He may be master of all the Sciences, and yet without this last accomplishment he cannot even make a copy, much less execute an original design."

We have placed Anatomy at the head of the Sciences, because it should form the corner-stone of the education of the Artist in scientific knowledge; the form, the locality, and the uses of every bone, joint, and muscle must be as thoroughly in his mind, as in the mind of the surgeon.

The effect of the movement of each joint and muscle must be clearly comprehended; every variation of which, especially with the muscles of the face, gives a new expression. He therefore who would become master of the art of producing an expression which shall be in harmony with the character, must become acquainted with its physical causes.

The most accomplished artists possess this acquaintance with Anatomy. Michael Angelo studied Anatomy twelve years. He was not only a Painter, but equally a Sculptor and an Architect, and it was this thorough knowledge thus acquired of the grammar of Art, that gave him such preeminence. Some of his sketches show that his practice was first to draw the bones, and then fill out the figure upon that skeleton.

By his perfect familiarity with every muscle in the human frame, he knew precisely which one should be brought into action, to express the passion or emotion that he wished to delineate.*

To this comprehension of the physical structure of the human frame,—which can be acquired in the same manner as that of any other exact science,—must be added some knowledge of Physiognomy; which can only come in its fulness from long continued observation of the infinite variety of faces which we are continually meeting. The harmonious relations of one feature with another, must be so fully comprehended, that it will be possible to restore a lost part, in all its perfection, by a knowledge of what is demanded by those features remaining. When the celebra-

*J. Quincy A. Ward, the best Classical Sculptor now living that America has produced, makes this perfect knowledge of Anatomy one of the main secrets of his success. In the statue of Commodore Perry, a figure nearly eight feet high, which he is now modeling, his practice shows the application of these principles.

Although the statue was to be draped from the chin to the extremities in the costume of the character, the Artist modeled the figure, nude; carrying out every detail of the external Anatomy perfectly, and subsequently proceeded to clothe it in suitable drapery.

ed statue, the Apollo Belvedere, was discovered in the uins of ancient Antium, one of the hands and other porions of the body were mutilated. The restoration was nade by Montorsali, but so bunglingly accomplished, that t has never received the approval of Artists. Nevertheless he statue is regarded as the most beautiful figure of its ind in existence. In like manner the features of the face nust present no incongruity ; the one with another, and the vhole with the character.

It is claimed by Physiognomists that the true character nay be read in the countenance; but whether Physiog-omy is yet reduced to so exact a Science as this statement vould indicate, certain it is that the natural characteristics f mankind are very strongly marked in the face, and so enerally is this accepted as a truth, that first impressions eceived, are acted upon with a very strong faith in their orrectness.

The nature of an individual is very often refined by xternal influences, until the face is no longer a complete ndex to it; but even then the physical conformation is lowly modified and ultimately harmonizes with it.

The growth of nations in christianity and civilization bundantly proves this fact. Nations whose early history hows them to have been but very little above the brutes, n their gross sensualism and savage ferocity, and whose ountenances bore the marks of their natures, have as they dvanced in refinement, developed also, into beauty and omeliness.

Individual cases like this often take place in a single eneration, and instances are not rare which are within ne knowledge of any observer It is said that the life of ocrates was a continual struggle against his natural pro-ensities, and if the busts that have been preserved of him re authentic portraits, we may well believe the statement. The face is certainly not one we should picture as belong-ng to such a character.

From accidental causes also, the face may become de-

formed, by the absorption of bony processes; the wasting of flesh and muscles, etc., until an expression will result which does not indicate the real nature of the individual. Portrait Sculpture is only redeemed from mechanism, and made a fine art, by this infusion of the moral character into the expression of the face.

If the artist fails to appreciate the noble and distinguishing traits of his sitter, and thus depict them upon the countenance, his work has not been worthy the labor spent upon it. He has but given us a copy of the form, but no clue whatever to the soul which animates it. All artists and physiognomists agree that the mouth presents a greater variety of expressions than any other feature. In Portrait Sculpture the mouth is the feature of all others for denoting expressions.

Neither the eyes, nose, forehead, ears or chin, or all combined have the power of conveying that of which the mouth is capable.

It speaks, without utterance, of every emotion of the the heart, love, anger, pride, scorn and contempt equally with joy and sorrow, have their insignia stamped upon the mouth.

These changes are so rapid and their continuance so evanescent, that the phrase "catch the expression" is often used with but little idea of its full signification.

It is this which makes portraits by a true artist invaluable as contrasted with many of the productions of the photographer. The one catches the fleeting expression of the soul and transfixes it for all time, the camera of the photographer but pictures the unanimated features.

"All parts of the face, doubtless have their fixed relations to each other and to the character of the person to whom the face belongs. But there is one feature and especially one part of that feature, which more than any other facial sign reveals the nature of the individual. The feature is the *mouth,* and the portion referred to is the *corner.* A circle of half an inch radius, having its

centre at the junction of the two lips will indicate the chief focus of the expression."—(Dr. Holmes.)

"In cheerful emotions as laughter, smiling, etc., the angles are pulled upwards. In fear, pride, hatred, revenge, disgust, contempt, consciousness of power, the corners of the mouth are drawn downwards. The union of so many muscles at the angles of the lips, produces that fullness about the mouth remarkable in those who are thin and muscular. In the child or youth whose face is plump, they make the dimple in the cheek.

The orbicularis is the opponent of all the muscles which are concentrated from various points to the lips; and it is by the successive action and relaxation of these antagonistic muscles that so much and so varied expression is given to the mouth.

This circular muscle, which has no origin and goes entirely around the mouth, is effected in various emotions. It tremblingly yields to the superior force of its counteracting muscle, both in joy and in grief. It relaxes pleasantly in smiling. It is drawn down more powerfully by its opponent muscles in weeping. This is the largest and strongest muscle of the face; it antagonizes all the rest, shuts the mouth, and from an opening as wide as the mouth can require, it shuts it at pleasure, so closely as to retain the breath against all the force of the lungs.

It is the true antagonist of all the other muscles; yet it acts mutually with them, in opening and shutting the mouth.

The bones determine the general form of the face; one great muscle, the masseter, gives the rounding of the cheek; the rest are delicate and moveable muscles, and the character of the face centres around the mouth and nostrils where those muscles converge.

A thin and delicate face gains in expression where the cheek is hollow, and at the angle of the mouth where the lines are strong. In a full face, these lines are oblitera-

ted, and the delicate turnings of thought and feeling are lost. All but the more violent expressions of passion are buried in the mass.

The great lines of character are the lines of the Zygomatic muscle, coming from above, and of the triangular muscle, coming from the chin, and the moving point towards which they all act, is the corner of the mouth.

In cheerful emotions they all rise towards the eye, which becomes full and distended.

In the depressing passions the features sink, the eye is languid, and the whole countenance has a serious, thoughtful cast; still the corner of the mouth is the central point of all these changes.

The corners of the mouth are continually supported by the action of the Zygomatic muscles.

They are raised in smiling so as to form the dimple; in laughter still higher, so as to swell the cheek, wrinkle the eyelids, and compress the eyes until the tears begin to flow. The corner of the mouth that is thus raised in laughter, is distorted in pride and drawn backward in rage, drops lower in grief, and in palsy falls quite down.

These various movements around the angle of the mouth are the chief indications of passion in the face, requiring careful observation for their full comprehension, and it must have already become apparent that this knowledge is of equally vital importance to him who would succeed in the art of Dentistry, as in the arts of sculpture and painting.

The "consummation of excellence is not attained until the artist has so mastered the rules that guide his practice that, in the execution of his work, he conceals all evidence of labor. It is this rare attainment, the art of concealing art, that leads to the erroneous belief in the inspiration of genius, that not only furnishes ideas to the gifted, but the mechanism essential to their right expression."

Herein is Dentistry a fine art; an "ideal art" in its full signification.

In the loss of the teeth, the absorption of the processes and the wasting away of the muscles and tissues as we have seen, the greatest possible detriment is caused to the expression of the human countenance.

The complete restoration of this feature, with all its power of expression, by art; art so consummate in the selection, arrangement and adaptation of its means as to defy detection, is the crowning glory of Dentistry *as an art.*

(To be continued.)

CORRESPONDENCE.

Massachusetts Dental Society.

Reported by EDWARD N. HARRIS, D. D. S., of Boston.

THE fourth Annual Meeting of the Massachusetts Dental Society, was held in Boston, on the 23d of May, at their Hall, No. 12 Temple Place, the President, N. C. Keep, M. D., of Boston, in the chair.

There was a full attendance of members from Boston and different parts of the State. The first two hours of the session, from 9 until 11½ o'clock, were occupied with clinics, by Drs. G. T. Moffatt, S. J. McDougall, T. B. Hitchcock and J. T. Codman, consisting of complicated operations of filling teeth. These exhibited a high degree of skill, and were witnessed with no little interest.

Several interesting specimens of morbid anatomy and of operative and mechanical dentistry were presented to the museum of the Society.

The annual reports of the Recording Secretary, Librarian, Treasurer, and Executive Committee were submitted and accepted. The report of the Treasurer showed that the receipts for the year were $368.75; expenditures $142.30; leaving a balance on hand of $225. The report of the Librarian showed that a good foundation has been laid for a library and museum.

Dr. L. D. Shepard, of Salem, reported progress in regard to the establishment of the proposed New England Dental Magazine, of which Dr. T. H. Chandler, of Boston, has been appointed one of the editors.

The Society then elected the following list of officers for the ensuing year: President, E. G. Leach, D. D. S., of Boston; Vice Presidents, H. F. Bishop, D. D. S., of Worcester, and E. N. Harris, D. D. S., of Boston; Corresponding Secretary, E. C. Rolfe, M. D., of Boston; Recording Secretary, J. T. Codman, M. D., of Boston; Librarian, G. T. Moffatt, M. D., of Boston; Treasurer, S. J. McDougall, M. D., of Boston; Executive Committee, T. H. Chandler, A. M., of Boston, T. H. Hitchcock, M. D., of Boston, G. T. Moffatt, M. D., of Boston, Dr. Edmund Blake, of Boston, and L. D. Shepard, D. D. S., of Salem.

Dr. Thomas H. Chandler was chosen orator for 1868, and Dr. S. J. McDougal as substitute.

The following persons were chosen delegates to the American Dental Association in Cincinnati on the last Tuesday of July: Drs. D. G. Williams, J. T. Codman, E. Blake, J. Thompson, C. F. Horne, W. S. Miller, T. H. Chandler, D. G. Harrington, A. Brown, U. K. Mayo, C. Whitechurch, D. W. Leach, A. Papineau and B. T. Currier.

Dr. E. G. Leach, on taking the chair, paid a merited tribute to the efficiency and services of the venerable retiring President, and expressed his own thanks for the honor conferred upon himself.

Henry F. Bishop, D. D. S., of Worcester, then delivered the annual address, which was a very able and excellent dissertation and was received with generous applause. At its close a resolution was unanimously passed, tendering the thanks of the Society to Dr. Bishop, for his most excellent address, and requesting a copy for publication in the proposed New England Dental Journal, and also two hundred and fifty copies to be printed in pamphlet form for distribution among the members of the Society. A

copy of this address has also been requested for publication in the American Journal of Dental Science, and will probably appear in a future number of that valuable Journal.

At half past three o'clock, the Society adjourned to the Tremont House, where the Anniversary dinner was provided. The dinner was served in an excellent manner. and when appetites had been appeased, several brief and pleasant after-dinner speeches were made, after which, the Society re-assembled in one of the parlors of the Tremont House, where the remainder of the evening was passed in an interesting and profitable discussion on the best methods of filling teeth.

This Society was organized in 1864, incorporated in 1865. It holds regular monthly meetings, on the second Tuesday evenings of each month, which are devoted to discussions in the different departments of dental practice, the reading of essays, and the presentation and examination of specimens of operative and mechanical dentistry.

ANSWERS TO QUERISTS. *Query 1st.*—Is it *ever* proper to destroy the nerve of a temporary tooth? *Answer.*—We prefer such palliative treatment as the application of creasote on a pellet of cotton to the exposed pulp; and only where such means fail to give relief, and the preservation of the tooth, for a time at least, is necessary, to avoid the consequences resulting from its premature extraction. such as irregularity of the permanent, &c., do we use devitalizing agents.

For some time past, in our own practice, we have applied carbolic acid to the exposed pulps of both permanent and temporary teeth, and have obtained satisfactory results from its use. It frequently happens in the preparation of cavities in both temporary and permanent teeth. that the decay has progressed so far that its removal necessarily exposes the pulp. In such cases as these we

should endeavor to preserve the vitality of the pulp, instead of destroying it; and the agent known as Carbolic acid will in the majority of cases, prove effectual in accomplishing this result.

Carbolic Acid or Phenole, is a colorless, crystallized solid, of a taste at first pungent and then sweet, and with an odor like that of tar. It was discovered in 1834, and exists in considerable quantity in coal tar. Chemically, it is considered as an alcohol rather than an acid and is soluble in alcohol, ether and benzole: for dental use it can be rendered fluid by the addition of a little cologne water.

The manner of using this agent is as follows: remove the carious portion as thoroughly as is possible without wounding the pulp; then syringe the cavity with luke warm water, and carefully dry with cotton, which being a soft material, is preferable in these cases, to bibulous paper.

A small pellet of cotton is then saturated with carbolic acid, and introduced on the point of an excavator into the cavity, and gently pressed upon the exposed portion of the pulp; another pellet of cotton is applied over this, and the whole is allowed to remain for ten or twelve minutes.

The cotton pellets are then removed and a small piece of bibulous paper, folded two or three layers thick, and slightly moistened with the Carbolic acid, is placed at the bottom of the cavity over the exposed portion of the pulp, and in contact with it, and the operation completed by the introduction of a filling of Hill's Stopping. After remaining several months in the cavity, the Hill's Stopping filling may be removed, when, in the great majority of cases, if the proper care has been observed in the previous treatment, the nerve will be found in such a condition as to justify, in the case of a permanent tooth, the introduction of a gold filling. It is well, however, to allow the Hill's Stopping filling, to remain in the tooth until it has so worn away as to be no longer serviceable; for

a properly introduced Hill's Stopping filling, until so worn by the friction of masticating, will preserve the tooth as effectually as one of any other material.

Where the pulp of a temporary tooth is not exposed, but the decay has progressed so far as to render it susceptible to the influence of changes of temperature, such palliative treatment as the application of creasote, or carbolic acid will prove effectual. In many cases the introduction of a pellet of cotton saturated with sandarach varnish, and allowed to remain one or two days will prove serviceable, by acting as a non-conductor, excluding air, and protecting the sensitive portion from the action of irritating agents.

Where, however, owing to the condition of the pulp, such palliative treatment fails, and its destruction becomes necessary, we do not hesitate in the case of temporary teeth, to use the preparation of Dr. Warren Welsh, known as *Welch's Nerve Paste*, which contains but one grain of arsenious acid in a quantity sufficient for more than two hundred applications. Applied to the pulps of temporary teeth, this preparation will prove effectual in destroying the vitality in from three to six hours, when it should be removed and the cavity well syringed with tepid water.

Query 2nd.—"What material is the most suitable for filling temporary teeth?" *Answer.*—We prefer Hill's Stopping to any other material for the following reasons: it is a non-conducting substance, consequently impressions of heat and cold are not conducted through it to the sensitive portions of the tooth; it is readily introduced, and but little pressure is necessary to properly condense it; in case of subsequent trouble a filling of this material can be readily removed.

Some advocate the use of Amalgam, others Os-Artificiel as materials for filling temporary teeth. In the use of Amalgam we have a material which readily conducts impressions of heat and cold, to say nothing of the effects resulting from the absorption of the mercury by the circulation; we also have in Amalgam a material so hard that

it is impossible, in many cases, to remove it, should trouble occur, without subjecting the patient to great torture, and in the majority of such cases the tooth would have to be sacrificed. Os-Artficiel is less objectionable than Amalgam; the greatest trouble in the use of this material being the length of time it is necessary to protect it from saliva, after it is introduced, in order that it may properly harden.

Query 3d.—"Is it necessary to lance the gums for the extraction of temporary teeth?" *Answer.*—We regard this operation as altogether unnecessary in the case of temporary teeth.

The connection of these teeth with the soft structures is slight, and the operation of lancing the gums has, in the majority of cases, such a terrifying effect upon the patients, that they will not submit to the application of the forceps.

Where the beaks of the forceps are carefully applied to the necks of the teeth, and no part of the gum is inclosed between them, laceration will not occur.

Want of space prevents us from answering other Queries in this number.

American Dental Association.

THIS body meets, according to adjournment, in the city of Cincinnati, on the last Tuesday of July. It is confidently expected that there will be a large attendance, probably larger than ever before. In order that the meeting be one of interest and profit, all the members should come with the full purpose of accomplishing the most possible. Every one should come with a purpose and a preparation to do his full share of the work. The responsibility of making the meeting an interesting one does not rest upon the officers, nor upon any committee, but it does rest upon *all the members* who may be present, and hence we hope that every one will bring his contribution, and time shall be afforded for its presentation.

The time of the Association, so far at least as the ar-

rangements of the Executive Committee are concerned, shall be devoted exclusively to its legitimate work; outside attractions will be wholly ignored, during the time of the sessions. We say this because of a thorough conviction that the members of the Association wish to have it so.

The Executive Committee have made ample arrangements for the accommodation of the Association; Hopkins' Music Hall, on 4th street, near Elm, a very excellent room, has been secured. There are sufficient ante rooms, and a fine room for clinics.

The Committee will be at the room as early as 8 o'clock on the morning of the first day, for the purpose of receiving the credentials of the new members. It is desirable that that part of the business be done before the regular hour of meeting, so far as practicable; Delegates will, therefore, report early.

Arrangements have been made for the accommodation of the members, with the Burnet House, Clarendon Hotel, and the St. James, in either of which the accommodation and arrangements will be all that the most fastidious could desire. Any parties wishing to secure rooms, can do so by notifying Dr. H. R. Smith, of Cincinnati, who will give prompt attention to such requests.

Very efficient arrangements have been made for the presentation and exhibition of instruments and appliances. We hope that all members having anything new and valuable, and even though it may be old and valuable, and not generally known to the profession, will not fail to bring it in. A fixed time each day has been assigned for each exhibition.

Any articles for exhibition, consigned to Dr. H. R. Smith, will be received and taken care of by him.

J. TAFT,
W. H. GODDARD,
H. R. SMITH,
Committee of Arrangements.

SELECTED ARTICLES.

ARTICLE V.

Deodorizing India-Rubber.

THE extremely disagreeable odor attaching to india-rubber manufactures, and the power possessed by them of imparting a nauseous taste to liquids or other substances, has long been a difficulty in the way of its use for many purposes for which india-rubber is peculiarly adapted. To obviate this evil many expedients have been resorted to, but none hitherto with perfect success, and this on account of the strong tendency which india-rubber has to acquire and retain odors. The new process, invented by Mr. S. Bourne, depends upon the still greater affinity possessed by charcoal, especially animal charcoal, for all kinds of odors, and its great capacity for the absorption of gases. The practical difficulty lies in so using the charcoal as not to injuriously affect the articles with which it may be brought into contact, and this has now been overcome by very simple means.

The mode of application necessarily varies according to the description of articles which are thus treated. Generally speaking, they are laid in shelves or trays in a hot chamber, with a thin stratum of charcoal beneath and on top, and exposed to a temperature of from 120 to 180 degrees for from three to six hours, after which they are removed from the charcoal, having sustained no other alteration than the all important one of being rendered devoid of smell and incapable of imparting any taste to liquids or other substances they may touch. Under proper management the most delicate textures can be thus dealt with without being impaired either in substance or appearance. The most convenient mode of applying heat is by hot water or by steam surrounding the vessel or chamber

in which they are placed. One very considerable advantage of this process is, that for a large number of vulcanized articles it can be carried on in co-operation with the heating or curing by which the vulcanization is effected, and they leave the chamber at once free from odor. It is equally applicable to india-rubber in sheet, spread fabrics, or the garments or other articles made therefrom when fully made up, such as the ordinary "macintosh" clothing, air and water cushions, etc. The use of this process enables the inventor to produce his "flexible diaphragms" (which were first brought before the public at the Dublin Exhibition, where they obtained a prize medal) in so pure a state that they may at once be used with the most delicate wines and other liquids. The diaphragm itself is a contrivance for the division of casks or other vessels into two separate chambers, by means of a flexible partition, which fits to the upper or lower part of the vessel alternately, or into any intermediate position, so that whatever the quantity of liquor contained within it, the air (though still exercising its pressure through the medium of the diaphragm) is separated from it by an impervious shield, and thus the injurious effects of exposure to atmospheric influence are altogether avoided, and any portion of the liquor may be withdrawn at pleasure, and as often as may be, without any admission of air to the remaining portion. In this way vessels of wine and beer are stated to have been actually kept in constant use for six and twelve months without any fermentation or formation of acid resulting. It is equally applicable to other liquids for domestic use or for medical or scientific purposes, the fluid remaining as completely secured as if the vessel were actually full.

An adjunct to this invention, and which admits also of independent use, is in the elastic valves, in two varieties—the one for giving vent to the products of fermentation, when desired; such as the carbonic acid gas generated by malt liquors, etc., the other for giving admission to air so as to enable the liquid to flow through the tap or other orifice. In the one case a circular disk of vulcanized india-

rubber is made to cover a small opening through which the gas is free to escape, but meets in its passage with the india-rubber, which being forcibly held down round its edge is at liberty to become distended, and in so distending opens a number of very minute holes, which have been pierced through its surface. When the pressure is removed, the disk again becomes flat, and its orifices shut. The degree of pressure to be sustained before these perforations open is perfectly under control, and may be adjusted to any required degree.

In the other form a small cylinder of india-rubber, closed at its lower end, is drawn over a corresponding cylinder of wood with a hole through its centre, and then tightly bound at its upper edge. The india-rubber has a number of slits made in its substance, which (when any orifice through which the liquor may flow is opened) receives the pressure of air, and yielding to this, opens, so as to let the air enter the vessel in exactly the same extent as the liquor is withdrawn. When the flow of liquor is so stopped, the edges of the slits become drawn together, so as to prevent any escape of liquor or gas in a wrong direction. Should there be any pressure from within upon the surface of the india-rubber, this will only tend to a more perfect closing of the slits, and, thus, while affording sufficient ingress, altogether restrain egress.—*London Pharm. Journ., February,* 1867, from *Journ. Soc. Arts.*

ARTICLE VI.

"Styptic Colloid." A New Styptic and Adhesive Fluid.

By Benjamin W. Richardson, M. A., M. D., F. R. C. P., Senior Physician to the Royal Infirmary for Diseases of the Chest.

"The use of collodion, or gun-cotton dissolved in ether, had for some years been recognized as of great service in covering wounds, and as I found that collodion was very easily diffusible in the form of spray, it seemed to me

that it might be applied in that form with advantage, and might even be made to coat a bleeding open surface. But on experiment it came out that in whatever way applied, collodion fulfils but a small part of the required duty as a styptic and a wound-healer. In the first place, it mixes indifferently with blood; in the second place, it forms but an imperfect adhesion; and lastly, it allows the transudation of air through its structure when laid upon a moist surface, and particularly upon the body, which is at all times throwing off watery vapor. At the same time the principle of the collodion process was excellent: to lay down from a fluid a deposit of solid matter by the evaporation of a volatile solvent was sound and beautiful action.

"The next point in advance, therefore, was to combine, if possible, with the ether and gun-cotton some other substance which being also soluble in ether and capable of deposit by the evaporation of the ether, would combine chemically with the blood, with the albuminous exudative matter of a wound, or with purulent matter.

"The idea only was wanted to secure the object in view. There was one substance which answered all these indications—I mean tannin. A mixture, therefore, of xyloidine, a substance resembling gun-cotton, and of tannin was formed into solution with ether, and from that came what I designated '*xylo-styptic ether*.'

"Brought into practice, the advantages of this solution as a means for stopping hæmorrhage at once became obvious. Indeed, as a means for the arrest of hæmorrhage, less than the application of a ligature to an open vessel, the spray leaves little to be desired. The extreme cold produced by the evaporation of the ether acts directly on the water of the blood, the tannin solidifies the blood by combining with it, and the cotton acts as a plug: thus every indication for arrest of hæmorrhage is secured.

"But in observing the action of the styptic spray, I soon became impressed with another fact, viz.: that after

the application to decomposing and fetid wounds and sores, the fetor entirely disappeared, the wounds commenced to heal with great rapidity, and a kind of natural covering appeared to form out of the secretion by its combination with the dressing above it.

"This observation has led me to simplify the application still further until it has come into this convenient form, a mere solution capable of being kept on the table as gum is kept, and. of being applied with a soft brush in the same simple way.

"The process of manufacture of the fluid is tedious, but sufficiently easy. The object to be aimed at is to saturate ether entirely with tannin and a colloidal substance, xyloidine or gun-cotton. In the first step of the process, the tannin, rendered as pure as it can be, is treated with absolute alcohol, and is made to digest in the alcohol for several days. Then the ether, also absolute, is added until the whole of the thick alcoholic mixture is rendered quite fluid. Next the colloidal substance is put in until it ceases readily to dissolve. For the sake of its very agreeable odor, a little tincture of benzoin is finally admixed.

"The solution is now ready for use. It can be applied directly with a brush, or mixed with equal quantities of ether, it can be applied in the form of a spray. In order to give to the fluid a short name by which it may be known, I have called it '*styptic colloid.*'

"*Properties.* When the solution is brought into contact with an open surface of the body, the resultant phenomena are these: the heat of the body gradually volatilizes the ether and the alcohol, and the tannin and cotton, as the ether leaves them, are thus left stranded on the surface in intimate combination. In proportion as the ether passes off, the blood or the secretion of the surface permeates the tannin and cotton; but tannin acts directly upon albumen, coagulating it, and transforming it into a kind of membrane, almost like leather. The

cotton meanwhile unites the whole, gives substance to the mass, and adhesive quality. When all is solidified, the dressing becomes, in fact, a concrete, having a true organic hold or basis on the tissue; and as the tannin, if the solution be freely applied, is in excess, any new exudative matter or blood is for several hours taken up by it, and the annealing is made the more complete.

"Thus, by this dressing, the air is excluded from every possible point in every possible direction, not by a mere septum, but by the combination of the animal fluids with the remedy; and because the air is excluded and fluid is absorbed there is no decomposition—*i.e.* no oxidation; and because there is no oxidation there is no irritation.

"The styptic and adhesive qualities of this fluid are easily demonstrated by observing its direct action on blood on serum, on pus, on albumen. You will see that it solidifies all these by mere contact with them.

"To these properties I must also add that of complete deodorization. Here is putrid blood, here putrid ovarian serum, here putrid purulent substance. They are unapproachable when laid on an open surface, but we bring them into contact with the solution, and they are deodorized. Further, the decomposed substance is fixed by the tannin and rendered inert.

"*Modes of Application.* Having thus laid down the principles at work in this method of treatment, let me next pass to the modes of application. I have here an artificial limb; a portion of it is covered with thin skin to represent the ordinary skin. At one part, for the space of six inches by four, there is placed under the skin a spongy substance charged with blood and albuminous fluid. I will now make an incision through the skin, and expose the bleeding surface. Suppose this to be an open wound, the two flaps of an amputation. I close it with silk ligatures in five places. This done, I take a little cotton-wool, tease it out finely in a wineglass, and saturate it with the styptic solution. Next, with a soft

camel-hair brush, I apply the solution freely over the closed wound, letting it lie between the edges. If blood exude, it simply combines with the solution, making a mass much like red wax. I lay on the solution also for a little distance beyond the wound, and wait a few moments to allow for the evaporation of ether. Next I take from the wineglass the saturated cotton-wool with forceps, and lay a seam of it half an inch wide and the eighth of an inch in thickness over the line of incision. Finally, I coat the whole over with another layer of the solution, and wait until the layer is nearly dry, cover with a little dry cotton, and, if pressure be necessary, carry over the whole a bandage.

"If time is a matter of importance, the evaporation of the fluid can be hastened by gently blowing with the warm breath over the solution as each layer of it is applied with the brush.

"Presuming that a cavity has to be treated, the fluid is often more neatly and handily used as spray. Thus, in treating the roof of the mouth for carious bone, or in plugging a bleeding alveolar cavity after extraction of a tooth, the spray is excellent. We begin in such a case by applying the spray direct to the bleeding surface, and when a layer of deposit is formed we use that as a foundation for a thin layer of cotton-wool ready saturated in the solution. Then we reapply the spray, and again cotton, until the whole operation is complete.

"For bleeding or fetid discharge from the uterus or vagina the spray is not advisable, because of the introduction of air. Here injection by the syringe is the best process, followed, if need be, by a plug of cotton-wool saturated with the solution.

"In cases of compound fracture, after the parts have been brought into apposition as far as is possible and fixed in the necessary position the fluid should be poured slowly into the open cavity so as to fill it. Then the parts externally should be covered with a layer of cotton-wool saturated with the solution.

"On open cancer, and on suppurating or decomposing surfaces, the solution may be freely applied with the brush, and afterward the parts may be covered with cotton-wool saturated with the fluid.

"In no case need there be any fear that irritation will follow the application of the solution. On the contrary, the action of it is so purely negative that it might be considered a sedative. It is not such in the technical sense of the term, but it so effectually covers the wounded and susceptible surfaces as to maintain what is virtually a sedative influence.

"After a fresh wound has been once dressed with this solution, it requires but little further treatment. In the case of small wounds they may be safely left with one dressing. In process of cure the dressing will slowly be thrown off in the form of a thick scale, and ligatures will also spontaneously come away. Even when the wound is very large, as after amputation, it is not desirable to try to open the wound unless there be systemic symptoms. In such case, in order to remove the dressing without pain, the bandage, if it be adherent, must be sponged at the adherent parts with a mixture of alcohol and ether, or with alcohol and water; this will set everything at liberty with ease and cleanliness. Water alone must on no account be used, neither hot nor cold.

"THE FLUID IN PRACTICE.—From these directions I may now move to the recital of a few typical cases in which this solution has been employed.

"*Hæmorrhage after Tooth Extraction.* At the request of my friend, Mr. Thomas A. Rogers, of Hanover Square, I was summoned on May 9th, 1866, at 10 A. M., to see a young gentleman who was suffering from a dangerous hæmorrhage from an alveolar cavity from which a large molar tooth had been extracted. Mr. Rogers had extracted the tooth at 5 o'clock on the previous evening, and from then until my arrival the bleeding had never ceased. I learned from the parents that all their children

suffered from the hæmorrhagic tendency in an extreme degree. The young man was now in a state of very great exhaustion, and the flow of fluid blood was still continuous. Laying him upon the floor, with his head raised, I applied the styptic, in the form of spray, directly into the bleeding cavity, and with such force at first as to dislodge the little pool of blood there. Continuing the spray, I was soon gratified at seeing complete arrest of the hæmorrhage. I now placed in the cavity a small pledget of cotton-wool saturated with the fluid, pressed it firmly home, and covered it with spray; thus, layer upon layer, I not only filled the cavity with cotton-wool and firmly-set styptic, but builded up the space between the two adjoining teeth with the same substances until the gap in the middle looked as if filled with what the dentists call a bone block. The bleeding was entirely arrested from that moment, and recovery was perfect. There was no sign of irritation in the wound, and when, four days afterward, the plug came away, all the structures beneath were healed.

"*Severe Hemorrhage from Necrosis of the Upper Maxilla.* A gentleman suffering ftom syphilis, extremely aggravated by excess of mercury, was last year brought under the care of my friends Messrs. Musgrave and Milson, of St. John's-wood. I saw the patient with them in consultation many times, and were all in much anxiety in regard to the roof of the mouth. The mucus membrane of the roof was thickened, red, percolated, and offensive; the fetor was almost unbearable, and every evidence of necrosed bone was present. The soft covering of the palate at length gave way, and the soft parts ulcerated, and about midnight on October 16, the necrosed bone loosened, and was partly displaced. In this way, the two descending palatine arteries were severed, and the most sudden and profuse hæmorrhage followed. I was summoned, and soon after my arrival, Mr. Milson also came. Unfortunately, we had to send some distance for

the styptic fluid, but meanwhile we tried, quite ineffectually, to plug with the perchloride of iron, and were compelled to trust to pressure with the fingers. When the styptic arrived, we played it freely in the form of spray over the bleeding points, and with instant effect in stopping the loss of blood. Then we plugged carefully with cotton, saturating each layer with the spray, and soon the mass set firmly, and no more blood was lost. By the time we had controlled the bleeding, we were gratified by the arrival of Mr. Paget, whom we had summoned; and as he, from having already tried the styptic, was content to trust to it, we did no more. It is the fact that this patient lost five pints of blood before the fluid was used, but the hæmorrhage did not return, the fetor no longer was present: and a few days later, assisted by Mr. Milson, I removed the dead bone. The removal laid bare a wide ulcerated surface or cavity, which we continued to plug with the styptic or cotton-wool; and so perfect has been the healing process that the cavity would now bear an artificial plate.—*Med. Times and Gazette.*

MONTHLY SUMMARY.

Diseased Meat.—Dr. Letheby has recently published an interesting paper on this subject from which we glean the leading facts.

The Doctor superintends the inspection of butcher's meat for the city of London, and some idea of the labours performed by the inspectors may be gathered from the fact that, during the six years in which the examination of meats has been conducted, nearly six hundred tons have been condemned and driven out of the market. The inspectors have been instructed to seize

1. The carcases and joints of all animals which have died from accident or disease.

2. The meat of animals showing signs of acute inflammatory disease, and of recent plastic exudation, for instance, of all exhibiting traces of pleuro-pneumonia.

3. The meat of all animals slaughtered during parturition.
4. All meat infected with parasitic disease.
5. The flesh of animals tainted with physic.
6. The meat of animals wasted by lingering disease, being serous, pale, wet, and flabby.
7. All meat in a high state of putrefaction.

Dr. Letheby gives several distinguishing marks of good and bad meat.

Thus, good meat is neither of a pale pinkish color, nor of a dark purple tint. The former indicates disease, the latter natural death, or acute fever. Good meat is marbled by small veins of fat which is hard and suety, and never wet; while that of diseased meat is soft and watery, often like jelly or sodden parchment. Healthy meat feels firm and somewhat elastic and scarcely moistens the fingers, while diseased meat is soft and wet, often so much so that serum runs from it. Good meat has little odour and that not disagreeable, while diseased meat smells faint and cadaverous, and often emits the odour of medicine, especially when fresh cut, or minced and treated with hot water.

Good meat shrinks little in cooking, while bad meat shrivels or boils to pieces. These differences are owing to an undue proportion of serum in the meat, and to excess of gelatinous or intercellular tissue, fat and true muscular fibre being more or less deficient. The average loss of weight of sound beef, on drying, is 73.3 per cent. and of mutton 71.5 per cent. while diseased beef loses 76.1 per cent. and bad mutton 78.2 per cent. The juice of good meat is slightly acid and abounds in potash, while that of bad meat is alkaline and soda predominates in it.

The relations of bad meat to disease in those who eat it are somewhat obscure. We know indeed that *trichina* can communicate itself to man, and that *cysticercus* in pork or mutton becomes tape-worm in human intestines. It has been asserted, however, on good authority, that diseased meat may be eaten with impunity. Dr. Letheby, however, traced an endemic of sickness, vomiting and great prostration of strength to some sausages made from a cow slaughtered while laboring under pleuro-pneumonia. He quotes the African traveller, Dr. Livingstone, to the effect that the meat of animals slaughtered while suffering from this disease, produces malignant carbuncle in those who eat it. He corroborates this statement by citing sta-

tics to show that after the importation of pleuro-pneumonia cattle from Holland, deaths from carbuncle increased more an six-fold, and the mortality from phlegmon multiplied thirty-ld. This ill effect of this kind of diseased beef cannot be estroyed or mitigated by boiling or roasting.

Reproduction of Bone.—Much has of late years been said of e power of periosteum to restore great waste of bone. We nd in a recent number of the *Boston Medical and Surgical ournal* a case reported by Dr. Henry J. Bigelow which is so in-ructive that we make space for a brief abstract.

A light-haired, unhealthy looking man, of a scrofulous family, jured his elbow which swelled and gave him great pain. Such welling and pain always accompanied all subsequent injuries of e same joint, for five years. Towards the close of that period, stulous openings made their appearance, communicating from ne side of the limb to the other, and discharging a thin sanious quid. The incision revealed in the humerus a cavity, the size f an almond, lined with caries. Three months afterwards, the ormation of abcesses having continued, the joint was opened. he ends of all three bones were much diseased, and the head of e radius, together with about an inch of the ulna and the same mount of the humerus, was excised. The periosteum, being rmly attached to the coral-like surface of the bones, was torn ut from these inequalities, and the wound was closed, the peri-steum being allowed to remain within. The constitutional rritation still continuing, five months after the excision, the arm as amputated. About a year following the amputation, the an died of pulmonary consumption.

Upon dissection of the amputated arm, it was found that both he condyles of the humerus, as well as the process for the at-achment of the flexors and extensors had been reproduced by he periosteum.

The Convertibility of Electricity and Heat is illustrated by oining a bar of antimony and another of bismuth, end to end, and passing a current of electricity through them, first from the one end and then from the other. The current passing from the antimony to the bismuth will be found, by proper tests, to part with a portion of its electrical intensity at the junction, and to

develope increased heat. That passing from the bismuth, on the contrary, will manifest increased electrical tension, evidently at the expense of the pre-existing heat, for the bar at that point will be colder than before the current passed. The same principle has been applied by General Morin, so as to produce a self-registering electrical thermometer. A thermo-electric battery—developing electricity by the application of heat—is arranged with one extremity of the pile in a medium of uniform and low temperature (ice) and the other in the medium the temperature of which is to be measured. A needle is magnetized by the thermo-electric current produced by this temperature, and its consequent deflection from a certain natural position is registered by punctures made by a dial of paper which is caused by clockwork to complete a revolution in twenty-four hours, and also to rise to meet the puncturing point at equal intervals, hours, half hours, etc., as may be desired. The punctures made at the several hours will indicate by their variation from a circle, the changes of temperature throughout the day.

Charcoal.—The interesting mystery of the power of charcoal to absorb, condense and change gases to vapors, engages continued investigation. Among the latest observations reported, the remarkable chemical activity in charcoal saturated with oxygen is displayed in the conversion of moist sulphurous acid and sulphuretted hydrogen to sulphuric acid; common alchohol to acetic acid, and amylic alcohol to valerianic acid; indicating a power of oxidation extending to a very wide range of effects, but to which ammonia showed an exception. The condition in which oxygen exists so largely and actively in charcoal is yet a mystery.

Formation of Cells in Animal Bodies.—Mr. E. Montgomery has communicated to the Royal Society a paper on this subject, in which he removes even cell-growth back among the processes actuated by the physical and chemical forces alone.

He calls attention first to the fact that cells of low organization, chiefly those of cancerous tumours, upon the addition of water, expanded far beyond their ordinary limits and at last were lost amid the surrounding medium. He thinks this phe-

nomenon explicable only on the assumption that the so-called cells are really uniformly viscid globules which absorb water till they are finally liquefied. The nuclei did not always show this change.

In embryonic tissues and in various tumours, single nuclei were seen, each surrounded by a shred of granular matter. On the addition of water, sometimes a bulge would take place on the edge of the granular mass, increasing to a globule and finally floating off; at others, the whole granular mass would turn into a globule inclosing the nucleus in its centre, and assuming the form of a typical cell. Sometimes again, several nuclei were connected with a granular mass, which, developing into a globule, enclosed them all, resembling in final developement, the "mother cell." The cell, therefore he reckons as really a viscid globule.

In searching for a substance which would furnish such results, he finally hit upon myeline. To this, dry and amorphous, water was added and from all the free margins, slender tubes, sometimes closely resembling nerve-tubes, shot forth. When white of egg was added, globules were formed. With serum, the globules exhibit lively molecular motions.

The author thinks he has definitely ruled out the vital force. We cannot echo his shouts of triumph. It remains to be proved first that living cells are always viscid globules; secondly that myeline will always generate nerve-tubes and globules by its own inherent forces, and thirdly that myeline is the foundation of all living tissue. When this is done, Mr. Montgomery will have to account for the reproduction of similar tissues from similar living membranes e. g. bone from periosteum, &c. We think our author's jubilation a little premature.

The Air Treatment.—M. Boisson has introduced a method of treating superficial wounds by a jet of air from the common bellows, immediately forming a dried film over the exposed flesh, beneath which healing is greatly facilitated and other obvious advantages secured. Burns which have removed the skin may be treated advantageously in this way.

Physiology of Respiration.—Pettenkofer has developed some very remarkable facts in connection with this important function.

He has found that there is a decimal variation in it, analogous to that which obtains in plants. The last named organism evolve oxygen during the day and carbonic acid at night. Animals exhibit in this respect their customary antithesis to vegetables. They evolve carbonic acid in large quantities during the day, wholly irrespective of muscular activity, while at night they lay up a store of oxygen for the requirements of the following day. Experiments on marmots show that these animals actually increase in weight during their winter sleep, and in the case of a man who occupied Pettenkofer's apparatus for two nights, it was shown that during the hours of darkness he absorbed 200 grammes more oxygen than he exhaled carbonic acid. Hence it is apparent that there is no direct oxidation of tissue or food into the ultimate products of combustion, water and carbonic acid. Indeed it is now known that this change does not take place immediately even in ordinary combustion. Intermediate products are formed in both cases, these being of course most numerous in the slower oxidation in the animal body.

There appears to be a direct relation between the injection of albumen and the absorption of oxygen. The more albumen is taken in with the food, the more oxygen is absorbed at night, and the less albumen is consumed, the less capacity has the body for taking of oxygen during sleep. In diseases of defective assimilation the storage of oxygen is heavily diminished.

The blood corpuscles, to use a simile of Pettenkofer's are a fleet laden with oxygen and carried to the most distant organs, when part of it is used up for the work actually going on and part is stored for future use. Carbonic acid constitutes the return freight of these minute vessels, which, miscroscopic as they are, nevertheless carry forward and backwards a load of four and a half pounds of each of these cargoes. By day they export carbonic acid; by night they import oxygen and carry it to every part of the system, so that it may be ready throughout the organism to supply the combustion of the following day.

Influence of Alchohol on temperature of the Body.—Drs. Ringer and Ricker state, as the result of a series of experiments on this question, that alcohol in poisonous doses decidedly lowers the temperature of persons in health. In ordinary doses it slight-

ly depressed the temperature in eight out of eleven cases. In febrile conditions its effect on the temperature of the body is both trifling and temporary.

Ether Spray in Strangulated Hernia.—Dr. John Barclay, reports in the British Medical journal, a case of strangulated hernia, in which reduction was accomplished after the use of ether spray. The pain induced by the most gentle handling of the hernial tumor was so intense, that Dr. B. had to desist from taxis. Having brought with him Richardson's ether spray apparatus, thinking it might be useful in lieu of ice,—it was determined to invert the patient, apply the ether spray short of freezing the skin, then to attempt the reduction, and, if failure was the result, to operate by the knife.

EDITORIAL DEPARTMENT.

Dental Education.—As the time approaches for the meeting of the American Dental Association, in Cincinnati, (on the last Tuesday in this month,) we are reminded of some of the views advanced at the last meeting held in Boston, by certain members of this body, during the discussion of the subject of Dental Education.

While the majority of those who engaged in this discussion did justice to the untiring devotion, both as regards energy, time and means, of the Professors of the different Dental Colleges; yet there were some who placed a very low estimate upon the labors of those, who have been instrumental in giving position to the profession of which they are members.

Dental Collegiate Education needs the support of the profession, and if the system is not altogether perfect in its theory, which we freely admit, how, we ask, is it to be improved by such Bœotian prejudices as it meets with? Every dental practitioner should be an advocate of Collegiate education and testify, by the pains he takes to encourage it, his sense of the treasure he or others have received. He should stand faithfully by those men who may meet with popular prejudice because of their efforts in behalf of a policy so wise; and should seize every opportunity by his pen, his lips and his influence, to lighten the burdens and responsibilities of those, upon whom such burdens fall. He should be an open and determined champion of all that tends to elevate the status of the profession; for by so doing, he will not only add to his own reputation, but will serve his vocation well, and guard the community from the arts of the empiric.

The demand for a high order of intelligence in our profession, was never more imperative than at the present, and the future promises to increase the demand almost beyond the power of human conception. Educate the members of a profession and you give rank and position to the profession itself.

Hawes' Tongue and Duct Compressor..—Since the attention of the profession was first directed to the adhesive property of gold, and the manner of using it in this form, a number of appliances have been invented to overcome the trouble arising from the flow of saliva and the movements of the tongue. None of them, however, appear to answer the purpose so well as the simple appliance of Dr. G. W. Hawes, so modified by Dr. W. N. Morrison as to render it an indispensible instrument in filling the inferior teeth.

By the use of this instrument the movements of the tongue are arrested, the flow of saliva checked, and the operations upon the inferior molars and bicuspids readily performed, without the annoyance to the patient which results from filling the mouth with napkins. "With this instrument the tongue may be clamped down in place and kept in position as long as desired." "The sublingual and submaxillary ducts may be very effectually closed by placing upon them rolls or pads of bibulous paper before applying the compress; a pad of paper or cloth should also be placed on the tongue before applying the instrument." It is so effectual in accomplishing the purpose for which it is designed, that we feel no hesitation in recommending it to the profession as the most useful instrument of the kind which has ever been invented.

Errata.—In the article on "The File as a Dental Instrument" in the May No. of the Journal, in the *first* sentence of the *third* paragraph the verb "to be" before the word "remembered" is superfluous.

In the second sentence of the same paragraph instead of the hyphen connecting the words "soldering—dental," there should be a comma.

In the *third* line of the *fifth* paragraph read the word "derivable" for "desirable." In the *seventh* line of the *eight* paragraph read "divert" instead of "direct."

In the article on "Osmosis" in May No. 18th page, 25th line read "inversed" instead of "increased."

Correction.—In the June No. of *Dental Cosmos* appears a very favorable notice of the *Am. Jour. of Dental Science*, for which we feel much indebted to Prof. McQuillen.

In the same article reference is made to a paragraph which appeared in the Editorial matter of the May No. of our Journal, confessing to a feeling of disappointment on our part that the *Cosmos* had passed over without notice, certain minutes in the proceedings of the Association of the Colleges of Dentistry. We cheerfully take the first opportunity presenting, to correct the paragraph referred to, the able article of Prof. McQuillen on Dental Education, published in the May No. of the *Cosmos*, rendering this acknowledgment necessary. It is but doing justice to the Editor of the *Cosmos* to say, that he was very decided and uncompromising in his opposition to the conferring of degrees irregularly, while the subject was being discussed at the last meeting of the Association.

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ORIGINAL COMMUNICATIONS.

ARTICLE I.

"*Dentistry as a Fine Art.*" *No.* 3.

By Norman W. Kingsley, Professor of Dental Art and Mechanism, in the New York College of Dentistry.

In the preceding articles we have endeavored to make the distinction between dental "Art" and dental "Mechanism" clear and unmistakable, claiming for dental art a wider range than is generally accorded to it.

The fundamental principles which govern it being the same as those which govern other departments of Fine Arts, we quoted language which had been applied to them.

Principles, are necessarily general in their character.

Their special relation to our own department, we propose to consider in the following pages.

In the construction of an artificial denture, everything that relates to its appearance, belongs to Art; everything that affects its utility, is controlled by mechanism.

It is not only possible therefore, but very common to see, artificial teeth that are worn with great comfort and may be as serviceable as any that can be made, and not a single element of true art has entered into their construction.

The adaptation to the jaws, and the articulation for masticating purposes, in these days of plastic materials, involves, no skill beyond that possessed by many a carpenter throughout the land ; but the form and color of the teeth selected, their arrangement with each other, and the adaptation of the whole to the demands of the unimpaired features, present an appearance which is a grim satire upon Dentistry as an Art.

With the methods of construction now in common use, and with the expectations of patients, in regard to time, and remuneration, it is a difficult task to remedy the evil.

But the fault lies with the patient only to a limited extent ; with the ordinary facilities given to the dentist, he fails most signally to make the most of them. The taste of the profession is at a low standard. The teeth often selected from a large variety, show such a want of an appreciation of the fitness of things, that it is a wonder that they are acceptable to the patient.

It may be argued that, with the present practice of depending upon manufacturers for a supply, it is impossible to make from a limited stock just what the case in hand demands, and thus the dentist would throw upon the manufacturer the responsibility of the failure. It is very true that the stock of artificial teeth, of any or all the manufacturerers has never come up as a whole to what ought to be the requirements of an educated and appreciative profession, but it is after all not so much the fault with the individual productions in the market, as it is the total want of taste, and artistic skill in the adaptation of even imperfect means. There has not been a time within fifteen years but what teeth have been made which could be so arranged as to fulfil to a considerable extent, an artist's ideal.

While the productions of the manufacturer have been, and are still, exceedingly faulty as perfect imitations of nature ; they have been, we have reason to believe, fully up to the requirements of a profession devoid of æsthetic culture.

Taking the profession as a whole, the manufacturers have probably in this respect been the educators, rather than the followers.

This is evidently reversing the natural order of things. Manufacturers are but commercial men actuated by the love of gain, governed by the laws of trade—demand and supply—and it is a shameful comment upon a profession of the pretensions of Dentistry that a trade which cares only to supply what is demanded, should have the credit of teaching it its own wants. What shall be said of the judgment and taste that dictates such orders as this to a Dental Depot?

"Please send me a set of teeth for a clergyman's wife of medium size, not too dark." (No sample accompanying the order), or this—"Send me by Express C. O. D. a set of teeth for a young lady with blue eyes." Further than this, what will be thought of the artistic excellence of the productions of the dentist who, as is the case in one of our large cities with access to an almost unlimited stock, puts in by the aid of workmen seventy-five sets per week? Where in such cases is the "Fine Art" of Dentistry which requires the same study of the individual as is necessary to paint or model a portrait?

As this article is intended to deal only with *Art*, we will consider first, its simplest developements—that which is the least removed from mechanism, and proceed to those requirements which are more subtle and complicated.

The making of an artificial tooth is purely the performance of a sculptor. To produce the original model when the market is to be supplied with duplicates calls into exercise the same talents. To *copy* carefully however the various forms of teeth as they are presented, is Art, only in a very limited sense.

To carve an *imitation* of a natural denture—not a copy of any specific presentation, which shall in each individual tooth possess a character in harmony with the whole number, and with the face; to so arrange the whole as to

assist in the very best expression of the surrounding features, and in addition, to give them the tone and color of nature; is an artistic accomplishment in the highest sense.

Let us be fully understood as to the distinction we here make between *copy* and *imitation.*

"Servile copying and elaborate detail require no effort of skill beyond the attainment of the most limited capacity."

Copying is simply a mechanical achievement.

In all larger objects the perfection of the duplicate can be ascertained by measurement: machines are now made to duplicate almost any irregular form that is required. In smaller objects, a correct eye to detect variations takes the place of instruments.

A copy admits of no ideal embellishment.

In making a copy the mind is a slave; but in creating an imitation the mind works with a freedom from all restraint. The true artist therefore rises above a mere copyist, and acquaints himself fully with nature in all her variety of developement.

He commits nature to memory in all her moods and diversities, and out of this storehouse, brings forth his *imitation*—which is in fact a new creation, and not the copy absolutely of anything. In the production of artificial teeth to supply the market but little art is required. The exercise of good judgement in the selection of natural organs to be duplicated in form and color, does not call into use the highest artistic talent. Artificial teeth when made by manufacturers should be in appearance, so far as they will be exposed in service, strictly copies from nature. We say *copies;* because the manufacturer cannot by any possibility take cognizance of the peculiarities of the individual for whom they will be used. He cannot therefore indulge in an imitation, and benefit the dentist so much as by strictly duplicating nature, in a full variety, and leave to the dentist to hide as far as possible the individual incongruities by an artistic arrangement. It is somewhat surprising with such facilities for accomplishing this result, so

far as forms are concerned, that the teeth in the market are so far short of the true standard.

Take for example the teeth without gums; the shape of the four incisors is generally very fair, but of the remaining number a large proportion bear but little resemblance to the organs they were intended to substitute.

The canines, which have individually more character than the others, and which have also more influence over the expression of the mouth, are in these productions as devoid of these qualities as a white bean. Of the bicuspids also, it is often very difficult to decide for which side of the mouth they were intended, and in some cases where the colour is uniform they might be inverted in the setting without any detriment to their appearance. While the manufacturers have undoubtedly done as much for the improvement of their productions as the mass of the profession would appreciate, there is still a great deal in this direction that remains to be done.

In the manufacture of teeth without gums either for plate or plastic work, there is no serious difficulty in carrying them almost to perfection. A faithful copy of a well selected variety of natural organs would accomplish the result.

The writer takes pleasure in bearing testimony to the great advance made in this direction a few years since by Dr. John M. Crowell, at that time engaged in the manufacture of teeth, who presented to the profession, forms of teeth superior to any before introduced. These forms were not only artistic improvements, but they bore unmistakable evidence of having been modeled or copied from nature. The peculiarities which they presented have been imitated by other makers, sometimes to such an extent as to be simply a caricature of the natural organs.

As has been before intimated, manufacturers make what will sell, and it is not to be wondered at that they should continue to fill the market with inferior productions so long as they find sale for them. But it is to be

wondered at that a profession that is brought into daily contact with the natural teeth, and should be distinguished for its good taste, are such partial observers as not to detect the inferiority.

This lack of cultivation is evidenced in other ways besides the one referred to. In a majority of the publications where engravings of the teeth are used as illustrations—the forms are positively ugly; and it is not the fault of the engraver—he follows copy closely; even to the imperfections. In the illustrations of the correction of irregular dentures, the models furnished the engraver, while conveying some notion of the change which has occurred, show in a majority of instances a disregard of the form of the teeth which would otherwise make the illustration much more effective. It is easy to see in many cases that the impression from which the model was made, was taken in wax and all the defects made by the draft of the wax in the removal, are shown in the model; left untouched, and carefully copied by the engraver. This lack of appreciation of the beautiful, graceful and true, lies clearly with him who furnishes the model.

The beneficial influences upon the mind of having it fully impressed with an ideal standard, are not inconsiderable.

It becomes a great help in the determination of any type to be used or adapted to any given case.

With the mind thoroughly conversant with any given standard of excellence, it becomes very easy by the laws of the association of ideas, to make, or select teeth with such deviations from it as may be desirable. It will be remembered that the most pleasing forms in nature are those with the softest and most graceful outlines—hard and angular forms do not give pleasure except by contrast.

In the development of the natural teeth the laws of harmony as universal in uninterrupted nature are beautifully illustrated. In the youth from twelve years old and upward, the features of the face present their most char-

ming appearance: all the lines are soft and rounded; sharpness and angularity come on with maturity and old age.

The teeth obey the same law. In youth, immediately after their full eruption, they present their most perfect appearance; their cutting edges and grinding surfaces are beautifully modelled; but as age advances the abrasion of the antagonizing teeth, together with the almost imperceptible friction of one against another in the same row, continually act so as to modify this form.

Thus, in taking the extremes we find the perfection of full developement in the youth, changed to a mere stump without beauty in old age.

To describe all the types that are found in nature and which may be in perfect harmony with the surrounding features would be impossible. It would be assumption to give any one as possessing all excellence, but as in art there may be a standard or ideal, accepted by a majority of cultivated people, so we may present a type which shall combine the beauties of many, and from which deviations may be made as circumstances require.

Figures 1, 2, 3, 4 and 5, show the front view of two canines, a central and lateral incisor, and a bicuspid.

They are drawn larger than nature to render their peculiarities more forcible.

1 2 3 4 5 6 7 8

It will be seen that neither in their outlines nor any portion of their surface, are there straight lines or angles; every portion of the surface presents that easy and graceful contour, an artist loves to dwell upon.

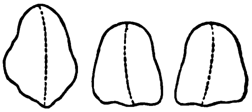
The outlines of the incisors which are less undulating than those of any other are still far from square or angular.

Each side is unlike any other side, and the cutting edge which becomes square from abrasion as age advances, is, when fully developed, curved and wavy; and this line, fuller in the centre and depressed each side, is continued up the face of the tooth forming a gentle ridge perpendicularly along its surface.

The narrower and rounder parts of the tooth, will also be observed; the changes from the flatter portions coming not by regular inclination but at a point about two-thirds the length of the crown from the cutting edge, the outline dips by a graceful sweep into a depression, which is common to all well formed teeth.

This line of beauty is very often neglected in artificial teeth, when arranged in a denture with the shape as given by the mould the spaces between them have the appearance of being made with a separating file; so perfectly uniform are they.

All the teeth anterior to the molars have a ridge more or less perceptible running perpendicularly along the face of the tooth—this is sometimes very faint in the incisors, but is shown very bold and in striking contrast in the canines. In the incisors and bicuspids it always assumes a curve with an inclination toward the median line; but with the canines, this order is reversed, and the ridge curves the other way: thus



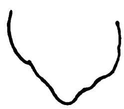
The central and lateral incisors, as any ordidary observer will have noticed, are very much the same in their general contour: the principle difference being, that the laterals are not quite as wide in proportion to their length and are about one-third narrower than the centrals.

In figures 2 and 5 are represented two types of canines. Figure 2 harmonizes better with the incisor shown here, than does figure 5.

Figure 5, would be more appropriately classed with longer and slimmer associates.

The characteristics of canine teeth are equally devel-

oped in both. The same graceful lines of beauty that marked the incisors are here also seen—the same depression on the sides of the upper third: the chief difference being that the canines at that point are rounder and bolder than the incisors; but below the upper third the difference is radical. The central ridge is very prominent and terminates in a cusp and the wavy line of the cutting edge of the incisors is duplicated, one on each side of the cusp, thus.



The posterior approximal surface is distinguished by a symetrically formed tubercle, more or less defined: but most certainly a mark of beauty. This tubercle is better delineated in figure 7 which is a profile view of figure 2. In figure 5, this tubercle with its corresponding prominence on the anterior approximal surface, is developed higher up on the tooth; which constitutes the main difference in the two types. In figures 1 and 8, we have a pure type of a bicuspid; the resemblance to the canine being easily seen: the same bold surface, cusp, undulated outline and posterior tubercle: the chief deviation in the external appearance being in a pretty well defined tubercle on the anterior approximal surface; and a relative reduction in size.

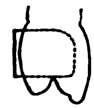
The characteristics of these three classes of teeth viz: incisors, canines and bicuspids are not confined to their front view.

Their profiles are equally peculiar; as shown in figures 6, 7 and 8. The central face of the incisor shows a regular curve; the canine has no less than three different planes or curves; the boundary between the upper third, and that below being marked by a decided prominence, while at the corresponding point on the bicuspid the profile is flat and the main fullness is below. The peculiarities thus pointed out, are all that concern the appearance of artificial teeth.

The second bicuspid does not differ materially from the first, and the molars are placed so far back as not to call for any especial criticism upon their appearance.

In passing we desire to call attention to a point that is almost always overlooked by the mere mechanical dentist.

The profile of the lingual surface is almost invariably *curved*, very *rarely* straight.

These teeth are oftener used to pass a clasp around than any other, and in a majority of instances the clasp at that point is made *flat*; and of course fits the teeth very inadequately,  or thus. 

The trouble arises from a supposition that the model is perfect, whereas if the impression is taken in wax, the model is sure to be faulty, and it is very often the case even with plaster impressions; and again, a lack of observation as to the real form, so that the model may be trimmed if defective.

The writer has hesitated, as to whether this article will permit of any suggestions or criticism, upon the color and tone, of artificial teeth, which will be of any benefit to the student.

That it is, in many respects, of equal or more importance than individual form, is undoubted, for with an artificial denture, faulty in form and weak in arrangement; if the color and tone exhibit good taste in the selection, it is a redeeming trait and worthy of praise. But as the faintest shades are of so much importance in this matter, and as they are so undefinable; the names of colors and their variations often conveying a different idea from what was intended that it is impossible to give more than the general suggestions of good taste. The manufacturer as well as the dentist, must in this especially, be a close student of nature, for only by long observation can the eye be cultivated to the nice discrimination essential to success.

One of the greatest difficulties to overcome is the scientific one, viz: to discover and combine in just proportions the materials that shall produce this wonderful imitation.

In no other art with which the writer is acquainted, has imitations of nature, been carried even now to such perfec-

tion. The making of artificial flowers has, perhaps, come the nearest to it. Certain it is, that of the materials which chemistry has already furnished us, it is possible to obtain most wonderful results.

For some cases the teeth made by Mr. Ash of London seem to be a closer imitation in their bony appearances, than most of our own productions ; out of the mouth they have a peculiarly vital appearance, but they are so illy adapted to the methods of making dentures common in this country that they have not to any extent come into use. The color of a tooth is dependent principally upon the proportion of its ingredients ; its tone upon the action of the fire in burning or baking.

The fault of many of the porcelain teeth of this country, is a crudeness or rawness in their appearance—a lack of translucency, which a little more heat would very much improve. It would blend the colors more perfectly, give them more vitality, and soften down the hard and angular lines of the the mould. It is perfectly in the power of our manufacturers with the materials now in use to make a general improvement.

One thing which is much wanted, is to increase the variety of darker shades ; not by hurrying into the market a lot of poorly baked, blue or yellow teeth ; but by a careful imitation of those organs in persons who have been habitually neglectful, until their teeth have acquired a tone or color which cannot be removed. While the dentist at large is dependent upon the manufacturer, he must cultivate his taste until he is able to select the most suitable shade which is prepared for him. When one or more of the front teeth are remaining either above or below, in a fair state of preservation, a tolerably correct idea may be gathered of what is needed ; and careful observation made of just such cases, as well as of all partial sets, taking into consideration, the age, complexion, &c., will do much to improve his judgment and enable him to make suitable adaptations when he has no such help. A few suggestions

will be manifest to almost every one. Fair teeth are admissable in younger persons; deeper hues are required for the aged. While we sometimes find in old persons, natural teeth, very fair to look upon, there is a seeming incongruity about it which we are not justified in imitating. It is safer to err upon the side of inserting those of a deeper tone than is really required. Excepting when some of the natural teeth remain, and then faithfully match or at least select a color that harmonizes, and will not be obtrusive or conspicuous. In all works of art, the subdued tones are the most permanently pleasing.

(To be Continued.)

ARTICLE II.

Root Filling. No. 1.

By Andrew B. Brookins, D.D.S.

What can I say with reference to the devitalization of dental nerves that has not already been said by those, something my seniors, both in practice and in years? Or what shall we do that has been left undone in the treatment of this class of cases, preparatory to the introduction of gold in the canals and crown cavities?

Among the practitioners of General Medicine, we have the infinitisimal Homœopathy, the heroic Allopathy, and the so-called Eclectic; the latter assuming the assurance of the first, the thunder of the second, with ostensible result of the trio. Let us see if we have not something of this kind in special medicine.

There is a class of operators, not in the minority by any means, that recommend and adopt too, the practice of filling over exposed commissures and nerves in dental caries; of filling crowns, the canals of which still contain vitalized nerves—with concomitant vessels; of filling crowns when the devitalization of these nerves have been effected either through the agency of therapia, the instrument, or by previous excessive inflammatory action, induced by con-

cussion, &c., and peradventure the putrescent mass still remains in the duct, in contiguity with live tissue.

They tell us their patients never return with, or complain of odontalgia or neuralgia. Painful oral or facial abcesses, dental fistula, exfoliations, &c., never make their appearance to break the refreshing slumbers of innocence, to annoy their quiet composure, or mar their beautiful faces. No latent nervous diseases that "human flesh is heir to" are ever developed,—long and weary years of feeble health with shattered nerves and enervated frames.

We will call the advocates of this "system" of practice "conservative," for we must take coguizance of the fact, that there is a vast difference between those who benefit their patients by organizing a *rational* course of treatment, (allopathy) by making them the beneficiaries of valuable professional services.

Let the labor be never so wearisome, your skill and patience be never so provoked, trusting in God and a clear conscience, rendering unto your patients your duty full and nothing wanting. I say there is a moral and a professional distinction, as well between those who benefit their patients by the rendition of actual services and those who withhold that service under the hallucination of speculative medicine, *similia similibus*, &c. We then have conservative as opposed to rational or essential treatment: and the question need not be asked, which shall we embrace, for "plugs" and "gutters" have had their days of inglorious supremacy, and can boast of their "ten thousand" slain.

It is unnecessary to designate between those who adopt this "convervatism" because the easier and fraught with less trouble, and those who are supposed to possess intelligence and christian sympathy, responsive to the tearful sufferings of those they are called upon to relieve.

The result must be always in harmony with the means, and the same end obtains whatever the motives of the operator. No matter if the question is raised in his mind

" what will be the finality if I destroy the life of this dental commissure, remove it and introduce in place a gold filling," leaving the canal filled with a devitalised mass to go through the process of decomposition,—and suppuration—absorption being quite out of question, save a sufficiency to color the organ throughout, adding insult to injury.

I cannot see how intelligent operators need look for other results than the formation of pus, and of course its discharge at a point offering least resistance. Pathologically, I see no distinctive premises between these cases, and what we can readily conceive to occur in general surgery. Take a carious tibia for example: will the surgeon cure this wasting, exfoliating bone by damming up the flowing purulent sanies in its uninterrupted current through the soft parts? Will he bind up the mouths of these fistulas at their openings through the integument, by compress and bandage or adhesesive strips and wait?

Waiting for what? for pyemia or hectic fever and wasting attrition of muscle and of life—his experimental " subject" is taken away beyond his "conservative" hand. To bind down and compress the free termini of dental nerves and vessels by the introduction of a filling, let it be the most plastic material that can be manipulated by the careful hand of the operator, it will be sufficiently non-resisting, by acting physically, to effect change of structure and position, physiological functions—inflammation and ultimately devitalization and suppuration follow. I believe it sufficient cause, per se, and I know of no evidence to the contrary, to arouse a morbid diathesis in other and distant parts of the economy, some of the uterine diseases, enervations, hemicrania or cephalalgia; for the brain, the magnum receptaculum of life, the citadel and resting place of the soul, is in voluble sympathy with all parts of the human economy.

Again the dental commissure may be devitalized and it may extend along the entire canal of the organ, if not al-

ready effected by the action of natural causes, before the application for treatment had been made by the patient, the former removed from its resting place in the crown of the organ, and the latter allowed to remain in the canal with impunity—as the doctrine of "conservatism" claims; and build up in place of the solution of continuity with a permanent filling and rest on the grinding approximal or other surfaces as if the work had been skillfully, faithfully and professionally executed, and in ninety-nine cases out of a hundred your patient will return, if she is able, and inform you of the presence of fulness or tension in the vicinity of the apex of the root with more or less pain from an unpleasant throbbing to acute, lancinating neuralgia; which generally begins at night and increases in severity until relieved by the discharge of pus to the great relief of the patient; the change of structure disappearing by subsidence of inflammation.

In a given number of cases, the dental fistula makes its appearance more often, immediately in the vicinity of or directly over the extremity of the diseased root; if in the superior maxilla at a line forming the inferior boundary of the oval vestibule, although not by any means confined to one place.

It sometimes happens that the pus effects an opening through the palatal arch and not unfrequently involves the ossa palati which together with contiguous structures slough away, or remain in a cul de sac in the dome of the arch until the knife of the dentist comes to its relief. It however is better in those cases to remove the filling, and cleanse the dental canal with tepid water every 6 or 8 hours till the tumor discharges itself through the tooth. The subsequent treatment hereafter to be considered, will be the same as for subacute pericementitis.

I was consulted in the month of March last, by an intelligent patient, who had been the subject of this kind of convervative *mal*-treatment at the hands of—a "plugger" during the first year of the civil war. Upon exami-

nation, I found a tumor occupying the arch of the palate, which from its size and position, materially interfered with her enunciation. My first inclination was to thrust a lancet through the walls of the tumor which was soft and fluctuating, but upon further examination I found a very imperfect filling in the anterior approximal surface of the left central upper incisor which was removed, and by sub- equent treatment the abcess was cured, and the canal and the anterior approximal cavity filled.

But this is one of many "conservative" cases I have cured within a few months.

There are other points of exit chosen by the pus than above enumerated, in the nasal cavities—in the chamber of Highmore, through the lips, cheeks, chin, &c.; and other results as well, such as exfoliations of the ossa palati, caries or necrosis of the maxillæ, sloughing of soft parts, &c.

Were I asked if there were cases in which I would devitalize the dental commissure, and fill the crown with a permanent filling, allowing the nerve in the canal to remain in its integrity as though we had it in our power to limit the destructibility of, our therapia; or if devitalized, suffer the whole morbid, putrescent mass to remain in the canal—as some advocate, as a professional doctrine—and introduce a filling over it, or if exposed, allow the commissure to remain, and use a cup, and envelop with a material sufficiently hard to prevent the pressure of the filling—(which had there been much hemorrhage I certainly would never do,) I would reply negatively always, unless I wished to entail upon my innocent patient long and wearisome hours and days of suffering, of pain, begotten by my own hand, unguided, however, by the approval of my better judgment. I have never yet seen, and as long as I live, never expect to see an opportunity in which conservatism in Operative Dentistry, can with impunity be resorted to.

There are dentists who are pleased to treat these cases in this way and send out "statistical" evidences of their

success. They like it and recommend it, on the contrary, I *abhor* it and wish it could be prevented by statute.

(To be continued.)

ARTICLE III.

Nature and Treatment of Decay of the Teeth.

A Review of Dr. Arthur's Monograph on Decay of the Teeth. By Professor H. R. Noel.

(Continued from page 123.)

There can be no doubt that a temporizing, vacillating procrastinating, course because of the mere age of the child is to be deprecated, and will eventuate in serious mischief. But even the most careful daily attention to the teeth, does not always save them.

"The teeth, are sometimes so defective in structure, or the secretions of the mouth are so acid in character, that their presence during the night will gradually destroy the enamel at the point of contact, although the greatest care for their removal should be taken during the day time.—(Page 24.)

Here a question suggests itself as to the degree of influence, which could be excited by proper hygiene and proper therapeutical agents.

We commence with defect in the original conformation of the teeth; defect belonging intrinsically to their intimate structure and composition; also depraved or vitiated secretions about the mouth, both probably dependent upon some vice of the system, hereditary or acquired. To change the nature of the teeth, to alter their intimate structure after complete developement, is not in our opinion, possible. And we believe that the exhibition of minerals, such as lime, magnesia and other earths, combined with phosphoric and carbonic acid, &c., for their direct effect or action upon the teeth, is to say the least, a purely theoretical assumption founded upon the supposed analogy between teeth and bone. This analogy we think to be questionable in the extreme.

As regards depraved secretions, &c., our power is not so limited. Proper remedial agents addressed locally and to the system generally, may restore to a great extent the tone of the secretions, and also the tone and vigor of the constitution. We could scarcely over-estimate the value of health at any age; but its value cannot be estimated, while the developing process is progressing; while the whole system of the child is being formed, being acted upon for good or evil by every agent and influence bearing the slightest relation to disease or health, and the susceptibility to impressions is more keenly alive than ever afterwards.

The foundations of the future are now being laid, and we should see well to the material of which they are to be composed. We cannot too

jealously guard the young, and this is especially true of the Digestive system.

The teeth, secretions of the mouth, secretions of the alimentary canal, action of glandular organs, should be most sedulously cared for, This is true! none deny it; and the medical practitioner is required to correct at once, any abnormal action in the digestive tract below the mouth; while too often, the mouth itself, the vestibule, the means of entrance, receives no attention whatever for years, unless severe fever or fetor of breath compel it, and when placed in the hands of the Dentist, presents the sad, crumbling wreck, so often seen; so bitterly repented of when too late.

Is this wise? Is this child receiving even meagre justice? We have examined the mouths of and elicited facts from about 180 persons, within 10 days and the results have been astounding.

In the number 180—taken indiscriminately from all ages, over 12—all occupations, both sexes and both colors, and their modifications, we have found 2 persons under 20 years of age, who have no perceptible decay of the teeth; the rest without exception have decay. Two only in 180—1-90th and this we believe is not exactly correct, and think a more extended observation would have given 1-100th or 1-200th.

The one indisputable fact remains; the teeth of the present generation (from whatever cause it matters not, the fact is the same,) are a grand failure. The theoretical value of enamel finds no corresponding application in its practical; for enamel has failed, utterly and completely failed to realize anything like its theoretical value. We know this statement will meet with opposition, but we are dealing with facts, facts obtained from examination of men individually and in mass, not only by ourselves but by many others, and we assert the truth of the position. The evidence in daily experience even, is overwhelmingly in support of the fact, that enamel as regards its practical value, has been greatly over-estimated. What objection can there be to its removal, when teeth approximate, since the experience of the past and observation of the present, alike demonstrate, that if not removed by the instrument it will be by caries?

The author's leading idea in the monograph hinges upon this fact. The truth is that enamel has failed to give adequate security and protection, and he advocates in the strongest terms the use of instruments where-ever the enamel is defective, fissured, &c.; or where teeth approximate in persons predisposed to caries. Smooth surfaces and open spaces are the ends to be obtained. We propose now to make free and lengthy quotations from the monograph.

"It is indeed true, that if the enamel is removed, and the teeth left in the same condition as before its removal, that is, if the affected surfaces be allowed to come again in close contact, decay will recur and go on more rapidly than before the removal of the decomposed parts. But when decay has not penetrated the dentine, or has extended to a very slight depth only,—in this part of the tooth and is removed as above directed, the disease is effectually arrested."—(page 27.)

The signs of decay by means of diagrams, &c., we omit, as being familiar to our readers. Teeth in contact are thoroughly examined, if decayed, separated permanently; if largely decayed, they are filled; if small superficial spots of decay exists they are removed. Teeth should be permanently separated wide enough to admit the bristles of a brush, that they may be kept cleaned. This is very essential, and thorough cleansing should be performed at least twice a day. All particles of food are removed, and the mouth kept as free as possible from deleterious agents. Our author approves pressing teeth apart, filing and then permitting them to fall back again as they were before being operated upon.

"The teeth so treated are then allowed to fall back in their former positions. But it must be seen that unless the decay is of such a character, that the gold alone of the fillings touch, when the teeth come again in contact (which is rarely the case) the condition of the surfaces so far as relates to the circumstances favoring decay, is the same as before the occurrence of the decay; it is worse indeed, for the friction between the gold and the orifice of the cavity can not be so perfect as the surface presented by the intact enamel."—(Page 31.)

The author separates these teeth permanently, whether filled or not.

"After the decay is entirely removed, the surfaces treated should be polished until they present an appearance as vitreous as enamel itself."—(Page 32.)

"Experience has established the fact, that teeth may be deprived of enamel on both sides, and remain free from decay during a long life-time."

"The writer has seen a number of cases, where teeth, one third of which were filled away, remain perfectly sound for the time stated."
Filed by Dr. H. H. Hayden 40 or 50 years ago.—(Page 33.)

"Where the enamel merely is decomposed, or before the dentine is to any great extent, involved, the affected part may be cut away without pain of consequence, commonly with none whatever."

"But when the decay reaches the dentine and penetrates to a slight depth the sensitiveness of the part is greatly increased."—(Page 34.)

"Experience has established the fact, that decay is not liable to occur where space exists between the teeth naturally, or has been artificially made. If there is reasonable certainty that all the teeth, back of the incisors will decay, is it not wise to separate them before decay occurs, as the object is then effected with less loss of substance of the teeth so treated?"—(Page 34.)

"It has been demonstrated that if the decay be removed at an early period after it occurs, and permanent spaces left between the teeth, where it has made its appearance, it is effectually arrested." "If the teeth are separated before it occurs at all, they cannot be in any worse condition than they are, when it is done after decay attacks them."

"The author therefore advises and does not hesitate to put into practice what he advises, the separation of all teeth back of the eye teeth if the incisors are decayed before the 12th year."

We have quoted freely from this chapter, and would suggest a candid investigation of the arguments, facts, &c. Facts are superior to theory

Several deductions can here be made:

1st. Enamel is not absolutely protective.
2d. Its removal does not necessitate caries.
3d. Separation of teeth opposes caries.
4th. Plain, smooth surfaces oppose caries.
5th. High tone of health opposes caries.
6th. Careful attention to the mouth opposes caries.
7th. Filing and separating in early life give little pain.
8th. Filing does not predispose to caries, but rather prevents, by giving open spaces, and a better chance for inspection.
9th. Children are especially adapted to this treatment.

Chapter.—IV. Is a review of the preceeding ground, many cases and examples cited, diagrams given, &c., with the author's experience and conclusions condensed from a careful examination of records kept for the last twenty years.

For fourteen years every important case is fully retained. The method of keeping these records is an admirable one; it is this: upon each page, at the top, are accurate engravings of the upper and lower teeth, so arranged that you look down obliquely upon their cutting surfaces and also upon their internal and posterior aspects; again others, giving the anterior and external aspects of the teeth. As any case is operated upon the work performed is noted down and the tooth marked accurately to show exactly the kind and nature of the labour bestowed upon it. Extracting, filing, filling, &c., have each its distinct and invariable sign or mark, so that with the engravings above and record below, the date of work, character, amount &c., are permanently secured. Comparisons between these engravings and the teeth of the patients, the condition when operated upon and the condition of the mouth after the lapse of months and years, have furnished concise and clear statistical data, upon which the author founds his treatment. Rigid and exact analyses of these cases, as there recorded, have led the author to conclusions not generally acknowledged by the profession. But yet the results are such, as to challenge inspection and study, and make us pause and weigh well the evidence, ere we condemn too hastily from theory, what practical experience seems to assert.

Omitting the numerous cases cited, we will give quotations embracing the results and conclusions arrived at by the author, using the aggregate numbers as we proceed. One book of Record—316 cases—63 transient and not noted; 253 accurately noted—gave 216 cases with more or less decay upon nearly all the sides of bicuspids and molars, at points of approximation; as a rule approximating sides were nearly invariably destroyed; 37 cases had no such decay, but their subsequent history was not obtained.—(Page 50.)

"Taking the first twenty pages of the book referred to, one case recorded on each page, there are found but three in which decay had not occurred, at nearly every point where the teeth are in contact, except the lower incisors."

"Thirteen out of the 17 patients were under 24 and 5 were not above 16 years of age."

"An examination of the other books of record, in the author's possession or of any portion of them shows the same condition of the teeth."—(Page 51.)

Now watch the conclusion at which he arrives, and the logical method with which he almost forces the reader to acknowledge the correctness of his treatment.

"If then it be true that in the great majority of individuals the whole of the teeth back of the incisors, are reasonably certain in time, to be attacked with decay, at or near the points of contact; if these latter show so great a tendency to decay, as to be attacked at a very early age, what is the best treatment for their preservation."—(Pages 51 and 52.)

If the teeth by contiguity, lodge the food, secretions, &c., and thus give the agents acting a longer and better chance to corrode the enamel, they must be permanently separated. The author does not let us stop here, he wishes to prove that time is valuable and children perhaps the best subject for this treatment.

"Now if it is certain that decay will occur ultimately on all surfaces of the teeth, back of the canine teeth, what possible advantage can accrue to the patient from waiting until it becomes *visible extremely?*"

"To wait indeed, until this period of its progress, renders the application of this remedy in most cases impossible."—(Pages 57 and 58.)

"The sides of the molar and bicuspids are so broad, and the decay usually commences so near the gum, that when the first slight discoloration is discovered, by a visual examination, near the grinding surface it will generally, be found that a large cavity has been formed."

"If some exceptional cases, teeth which might never decay, should happen to be separated, in this way, there is no serious injury done, for the teeth so treated are not more liable to decay, than if they had never been touched."

"All the author's experience justifies him in coming *most positively to this conclusion.*"—(Page 58.)

Should decay occur, which in cases of very strong predisposition to, the author's treatment could not prevent, yet even then:

"The surfaces are so exposed (to view) that the slightest attack can be detected."

Here the author brings in many examples to prove his position of "no injury from filing, when well done and a polished surface left." One case, accompanied by an engraving, represents the front teeth of a gentleman 65 years of age, who was operated upon by Dr. Hayden, when he was a mere youth; the Dr. filing two of his teeth for decay and the marks of the file are still there, perfectly distinct but no evidence of a return of the decay thus removed.

This is rather a crucial experiment as regards time.

After citing several cases of children the author sums up as follows:

"A much smaller number of fillings were required to preserve the teeth: the arrest of the decay was effected by a simpler and much less expensive process than filling; it was almost devoid of pain."

These are strong points and we give them great weight; in regard to children this is eminently true and important if true, and we accept the truth of it. Let any one of the profession who doubts its truth, refute it; we would be very grateful if this is not true, for a refutation of it.

Unsightly or disfiguring separations need never be made, unless the teeth are badly decayed, and then it is only a question of time when the whole tooth goes unless filled. Seen in time the operations are nice and appearance good; seen too late it is the fault not of the operation, but the condition of the patient's teeth.

This record book gave, 4966 points of decay, 2298 upon grinding surfaces, results of defective enamel, necessarily filled; 2,668 cases occurred on the sides or surfaces in contact, where the enamel should have been, and doubtlessly was originally perfect. Had the teeth been kept thoroughly clean, no decay need have occurred except in some very bad predispositions to, but the age, &c., of the patient precluded the idea. From various causes the author did not, at that time as rigidly enforce his practice, as he now does, and as a consequence, 1938 fillings had to be inserted; leaving 730 points of decay. Upon these the author remarks:

The decay was removed from 730 places, and the teeth so treated, many of them as long, since as seven years, now remain as perfectly sound as when the operations were performed."—(Page 69.)

The monograph concludes with some remarks upon the rapid increase of decay, and the necessity of some means for arresting it in the early years of life.

Removal of Decay—permanent separation—polished surfaces—constitute the author's treatment in by far the majority of cases of children, when seen in time.

Separation in time constitutes the

"PROPHYLACTIC TREATMENT."

We give this to the profession, as we receive it from the author, at the same time we know many will oppose this practice.

We ask, "prove the error, when you condemn."

The clear, forcible, reasoning of the author; his tenacious earnestness; the inevitable logic of his conclusions if you grant his premises; the stubborn array of facts, and his long practical experience demand of us a cool, unbiassed thoughtful consideration of the subject.

Should he be wrong, he is intensely, enthusiastically wrong; and his position and standing are such that he can do incalculable injury. Should he be right, he is equally as intensely and enthusiastically right; his position upon this question—his views—his opinions, the results of his practical experience, cannot be too widely known among the profession,

or too thoroughly and readily adopted. If it be a fact, it is one of the utmost importance, and the profession should know it, and act upon it; if it be not a fact, try it, test it, one year will send it to the winds. Try it by actual, patient experience, discard prejudice and preconceived opinion unless well founded.

Give it a thorough trial, the children of your patrons deserve the experience you will gain by it.

We will accept no theorizing in this matter, unless in accordance with facts; we have given the profession opinions and we have given facts also, and in return our position can only be assailed by opinions founded upon facts. We care nothing for theories, we must have the results of practical experience and patient observation of the phenomena of decay as seen in the living subject.

If the position be a false one, refute it by facts.

The summary would give the following as points for candid consideration.

1. That our best authorities sanction filing as one means of treating decay.

2. That filing does not, when well performed, cause decay, but rather opposes it.

3. Removing the enamel itself does not necessitate decay.

4. That where teeth approximate, decay is most liable.

5. That if the contigous surfaces of the upper incisors show evidence of decay in youth, the prognosis as regards the other teeth at points of contact, is unfavorable.

6. Experience demonstrates the fact, that in by far the majority of persons, teeth in contact sooner or later decay

7. That a permanent separation of the teeth in contact, where a pre disposition to decay exists, even where both enamel and dentine are removed to a limited extent, not only does not increase but greatly diminishes the tendency to decay.

8. Where teeth are separated permanently, they can be better exami ned and decay sooner detected.

9. That this is the true treatment in cases of children; being less painful, less expensive, and more certain than filling.

10. That in all cases, a smooth, plane, highly polished surface should be left, if possible.

In the monograph and in the review of it, the whole question has been one of fact and experience, there is no theorizing about the minute anatomy, histology, &c.; no discussion of theories as to the developeopement of the teeth.

We propose in a future article to examine minutely the opinions of Huxley, Beale and others, as to the structure of the teeth, their developements; their amount of vitality; the question of vascularity, &c., and endeavor to ascertain the true position of enamel and dentine, and then discuss the essential nature of Caries.

The vital theory of Tomes, and the acid theory, will each in turn be subjected to a rigid examination.

We will endeavor to give a physiological explanation of the practica experience, which has lead one author to the

"PROPHYLACTIC TREATMENT OF CARIES."

The equation or problem is this

Given—or known Quantity,

"RESULTS OF PRACTICAL EXPERIENCE."

Wanted—or Unknown Quantity,

"PHYSIOLOGICAL EXPLANATOIN."

ARTICLE IV.

Dental Surgery as applied in the Armies of the late Confederate States.

By W. LEIGH BURTON, Dentist, Richmond, Va.

DENTAL SURGERY has assumed such importance within the last few years as to place it much above the position which was at one time assigned it, when barbers and blacksmiths were about the only representatives of the profession. Concerning the primitive condition of the art in this city, the late, venerable Samuel Mordecai in his delightful book, *Richmond in bygone days*, says:

"Now adays the profession of dentistry gives lucrative employment in our city to a score of practitioners. In the days of my boyhood, only one *Tooth-drawer*, who probably never heard the word dentist, did all the work and all the mischief in the dental line."

"Peter Hawkins was a tall, raw-boned, very black negro, who rode a raw-boned, black horse, for his practice was too extensive to be managed on foot, and he carried all his instruments, consisting of two or three pullikins in his pocket. His dexterity was such, that he has been known to be stopped in the street by one of his distressed brethren, (for he was of the church,) and to relieve him of the offending tooth, gratuitously, without dismounting from his horse. His strength of wrist was such, that he would infallibly extract, or break a tooth, whether the right or wrong one. I speak from sad experience, for he extracted two for me, a sound and an aching one, with one wrench of his instrument."

"On Sundays he mounted the pulpit instead of black bare bones, and as a preacher he drew the fangs of Satan with his spiritual pullikins, almost as skillfully as he did the teeth of his brother sinners on week days, with his metallic ones."

It is undeniably the case that, even in this period of the world's progress, there are some persons who profess to

have but little faith in dentistry and who boast of never having required dental operations; but it is generally found that they are blessed with very sound teeth and consequently, would have about as much occasion to employ a dentist as a perfectly healthy man would in calling in a physician. And stranger still, there are actually *physicians* who are not only skeptical of dentistry and regard it as a "modern innovation," but even look upon its practitioners as upstarts, and as aspirants for titles and honors which belong only to themselves. It is perhaps unnecessary to say that, generally speaking, those who are so jealous of an encroachment upon their rights and privileges are either very old men who have followed the same beaten track, and prescribed the same medicines for the last half century; or else very young ones with little or no brains, whose appreciation of a diploma is based upon the difficulties and length of time in acquiring one, extending generally over a considerable period. In spite, however, of the prejudices of some, it is true, very few narrow minds, society at large appreciates the importance of dental surgery as bearing upon the health and comfort of every community, and as a rule, its practitioners keep pace with the age in education, refinement and accomplishments. Every year witnesses the advent of candidates for public favor whose training in our colleges has been careful and complete, the introduction of some new invention or the application of some new principle; and it is with some pride that we compare the dentistry of to-day with that of fifty years ago.

During the progress of the late unhappy war, it soon became apparent that the soldiers of the Confederate armies stood sadly in need of the services of dentists. Most of them being from extreme sections of the country, without means, being cut off from all communications with their homes, and their pay being totally inadequate to meet the most ordinary and pressing wants, it was out of the question for them to attempt to pay for dental opera-

tions. Particularly when it is remembered the price of one gold filling in the depreciated currency of the Confederacy, was more than six months pay of a private! The price demanded for gold foil in 1864 and the beginning of 1865 was sixty-four dollars per oz. in gold coin. This amount in confederate money would be, three thousand eight hundred and forty dollars, for the prevailing price of gold was sixty for one. Having to pay so enormously for materials—the value being enhanced from the fact of their having to run the blockade—the charges of dentists were proportionally high. The charge for a gold filling was \$120.00, for extracting a tooth \$20.00, and for an upper set of teeth on gold or vulcanite base, from \$1800.00 to \$4000.00. Let it not be understood that high prices were confined to dentistry alone. It was no uncommon thing to pay \$1800.00 for a coat, \$300.00 for shoes, \$1000. 00 for cavalry boots, and from \$300.00 to \$500.00 for an ordinary felt hat. A man considered himself lucky in being able to purchase a turkey for \$300.00, which was indeed above the gold standard, but confederate money was plentiful and turkeys were scarce, and the scarcity became greater in proportion to the frequency of the raids of Federal commanders, so that before the close of the war it was with difficulty that fowls could be obtained for love or money.

From the above examples of prevailing prices it is very clear that a confederate soldier getting eighteen dollars per month could not afford to pay for dental operations, and the question arose, what was to be done for the amelioration of his condition? This question was solved by the rigid conscription laws passed by Congress; dentists were conscripted, and the Surgeon General of the late Confederate States, with a forethought and humanity characteristic of the man, determined at once to make their valuable services available to the armies.

It must not be imagined that dentists were conscripted without a show of resistance on their part. Physicians

of "seven years practice" were exempted from military service, and as dentists were not mentioned, it was contended by some that Congress intended to include them as *special practitioners.* This interpretation of the law met with not only the most violent opposition from some few old fogy physicians, who ridiculed such assumptions, but was overruled by the war department through its representative Judge Campbell. and the conscription of dentists was ordered to be proceeded with at once.

Already eminent legal opinion had sustained the dentists that they were exempt by the law as *physicians,** but to test a matter in which so many were interested, Dr. Hunter of North Carolina, brought his case before the courts of his State, and Judge Pearson decided that *he was exempt.* Congress, having heard of the decision in this case, upon revising the exemption laws, determined that no ambiguity of language should lead to any further exemption of dentists. They seemed to have forgotten in consulting the requirements of every community, that the same efficiency could not be reasonably expected in dentists over the conscript age as in younger men. It does not follow that the older a man is the better the dentist. Good eyesight and a steady hand are indispensible. This enlightened body, however, not looking upon the matter in the same light, had inserted in the clause exempting physicians, "the term physicians *not to include* dentists," and thus the question was settled.

Surgeon General Moore immediately made application to the Bureau of Conscription for the detail of dentists for duty in the hospitals, and after some months of experiment, he caused to be issued the following order.

"OFFICE OF THE MEDICAL DIRECTOR
C. S. HOSPITALS IN VIRGINIA,
RICHMOND, *Va.*, *Nov.* 4. 1864.

CIRCULAR
No. 15.

I. As far as practicable in future, the operations of dentistry required

*Reference is made particularly to the late Gen. Geo. W. Randolph Sec'y War of the C. S.

in General Hospitals in Virginia, will be performed by officers, soldiers or conscripts assigned to those duties, who are dentists by profession.

II. Examinations will be made, at such times as may be fixed by the surgeon in charge, of each officer and soldier admitted into hospitals, and the necessary operation performed with the concurrence of the attending Medical officer.

III. Dentists are expected to be provided with their own instruments, but the necessary materials and files will be purchased with the hospital funds, and requisition made for other instruments thought necessary.

IV. Dentists will have the rank, pay and perquisites which their position in the army entitles them, and in addition, such extra duty pay for extraordinary skill and industry, as the Surgeon General will allow, in accordance with general order, No. 66, A. & I. G., office, current series.

V. Monthly reports of Dental operations and accompanying registers in accordance with forms furnished, will be forwarded through the Surgeon in charge and through this office, to the Surgeon General by the 5th of the month succeeding.

(Signed) WM. A. CARRINGTON,

Medical Director of Gen. Hospitals in Virginia.

It would be next to impossible to form an idea of the wretched condition of the teeth of Confederate soldiers. The great majority had been several years in service without as much as even having had their teeth examined ; and this neglect coupled with habits of carelessness, an absence of tooth brushes, and the miserable and scanty food upon which they subsisted, only hastened their destruction.

In selecting a material with which to fill the teeth of these men, it was desirable to have something which was not costly, that could be easily applied, and which would at any rate, preserve them until such a time when gold might be substituted, and for this reason amalgam was chosen.

Without stopping to discuss the merits or demerits of this material, it is enough to say that, for this purpose, it answered admirably. In every case the carious portion of the tooth was thoroughly removed, and when a large number of teeth required attention, the operations were greatly facilitated by the use of it.

The principal operations performed were filling, extracting teeth and removing the tartar, which from neglect, had accumulated in nearly every mouth to a most extraordinary extent ; the adjustment of fractures of the bones of the mouth and the treatment of wounds of the face. From the time of the assignment of the first dentist to

duty in March 1864, the number of operations performed exceeds all belief. A day's work consisted of from twenty to thirty fillings, the preparation of the cavities included, the extraction of fifteen or twenty teeth, and the removal of the tartar *ad libitum !*

Besides a detailed monthly report of each operation performed, in which the date, patient's name, rank, regiment, company, and the operations, were required to be given, a summary was attached in which they were consolidated after the following order: Number of patients operated on—Teeth extracted—Fillings inserted—Teeth cleaned of tartar—Fractures adjusted—Other operations—Total number of operations performed.

Concerning fractures of the bones of the mouth, the number of cases was not so large as might have been expected from the fact that, in the year 1864 to which reference is made—the fighting was in a great measure from behind breastworks, when of course the head is more exposed than the rest of the body. In such cases as presented themselves in and around Richmond, the reduction of the majority of them was effected through the agency of *gutta percha*. The case of Jas. H. Hutchinson, Co. C., 53d Georgia regiment, 2nd division, Jackson Hospital, affords an example. His was a fracture of the superior maxilla, left side, involving the first and second bicuspid teeth. After forcing the fracture into its proper position, gutta percha—having been softened in warm water—was pressed on the teeth included in the fractured portion and extended to the firm teeth, the lower jaw closed and the teeth embedded in the lower portion. It was then carefully removed, placed in cold water to harden and readjusted afterwards. This accomplished all that could be desired. The fracture was held perfectly firm, the material afforded a pleasant rest to the jaw, and left an opening through which food might be received, and at the same time, it was not affected by the secretions of the mouth, or by discharges from the wound.

The case of Lieut. Morehead—North Carolina Cavalry, quartered in general hospital No. 10, was similar to the above, only more complicated. A minnie ball carried away the canine, first and second bicuspid teeth, left side, inferior maxilla, fracturing the bone to the left of the *symphysis*, passed under the tongue, the counter stroke fracturing the right side of the bone near the *mental foramen*, and passed out under the angle of the *ramus*, carrying fragments of teeth and bone with it. Bond says in his work on dental medicine, Article Fractures; "The general treatment of fractures consists in meeting the following indications; 1st. To restore the displaced pieces of bone to their natural position. 2d. To keep them there; and 3d. To afford any additional aid which the nature of the injury and the constitutional circumstances may require." The two first indications were fully met in this case, but to ensure certainty, after the *interdental* splint had been applied, an outer splint of the same material was made to conform to the shape of the jaw and the common bandage applied. The next day the patient feeling so entirely free from pain, he was furloughed to go home, where he soon recovered. The only thing which the writer of this article claims for the use of gutta percha in adjusting fractures of the jaw bones, is, its originality as far as concerns himself. Pasteboard softened with vinegar and water has been the usual material employed in such cases; but it appears to the writer that any man possessed of common sense and knowing the peculiarities of gutta percha, would naturally fix upon this substance. Dr. James Bolton in a communication to the *Richmond Medical and Surgical Journal,* states that he has used it in cases of fractures of the jaw bones, and no doubt others have with the same success.

The interdental splint of Dr. Bean of Atlanta, Ga., upon which an elaborate article was furnished the January number of the journal above referred to, by Dr. Covey, deserves especial mention. But from the subjoined letter

even this appears to be nothing new. The writer having having heard of the accident to Mr. Seward in April, 1865, by which he sustained a fracture of the lower jaw, was emboldened by the dictates of humanity to call the attention of the Surgeon General of the United States to this splint, and received the following reply.

"SURGEON GENERAL'S OFFICE,
WASHINGTON CITY, D. C.,
April 26, 1865.

SIR:—

I am directed by the Surgeon General to acknowledge the receipt of your letter of the 24th inst., calling his attention to an interdental splint (Dr. Bean's) as likely to be of service in Mr. Seward's case of fracture of the jaw, and to inform you that the same splint is now made by Mr. Gunning in New York.

Very respectfully your obedient servant,
By order of the Surgeon General.
(Signed,) C. H. CRANE,
Surgeon U. S. Army.

While this reply disposes quite summarily of Dr. Bean's interdental splint, it is questionable if Mr. Gunning *was* making precisely the *same* splint, though it might have been constructed on the same general principles.

During the occupation of Atlanta by the Confederate forces this splint was applied in over *one hundred cases* with such invariable success, that Surgeon General Moore ordered Dr. Bean to Richmond, in order that his splint might be laid before the army Medical Board of the Confederate States. A meeting of the Board having been ordered at the private office of the writer, the drawings and models exhibited and full explanations made by Dr. Bean in person, the members, whilst arguing that the principles of it were not entirely new, were unanimous in recommending its general adoption; and shortly afterwards—dentists on duty having been instructed in its construction—the Surgeon General ordered a ward to be prepared at the Robertson hospital for the exclusive treatment of all cases in which it could be applied. A minute account of this splint having already been published, it is scarcely necessary to enter into a particular description here. Suffice it to say

that, models of the parts having been obtained by a peculiar and scientific process, it is constructed of *vulcanized rubber*, instead of *gutta percha*, and applied in the same manner.

Among patients in the hospital, the treatment of exposed pulps was practiced to some extent and many teeth saved which would otherwise have been lost; and whilst the paste is used in the office of nearly every dentist, the proportions are given for the reason that, its application having been attended with such uniform success, some might desire to test its efficacy. They are the following:

℞	Acid. Arsenios	gr. xxx
	Morphiæ Sulphatis . . .	gr. xx
	Kreosoti	q. s.

The insertion of artificial teeth on plates was not included in the operations allowed. In some instances pivot teeth were inserted or readjusted, and in this connection it might not be out of place to mention a plan adopted by the writer for securing a more perfect adaptation of the tooth to the fang. It consisted of a piece of thin rubber introduced between the tooth and fang in the shape of an "O," through which the pivot entered the fang. In readjusting these teeth, it was often the case that the fang after being filed, caused the old tooth to be so much shortened as to be useless, which in a time of great scarcity of materials was no trifling consideration. By the use of the rubber the tooth was not only lengthened sufficiently to be used again but it was found that *moisture was entirely excluded* as long as the pivot remained firm, thereby adding greatly to the preservation of the fang.

The experiment of dental surgery in hospitals having been received with such universal favor, dentists were assigned to the most important points thoroughout the Confederacy; and so convinced was the Bureau of Conscription of its importance, that notwithstanding the need of men for field service was more urgent than ever, no obstacle was interposed to their appointment. Thousands of men

throughout the southern states can attest to the benefits they received by its adoption, and it is confidently believed that had the necessity for its longer continuance existed, it would have led to the establishment of a regular Bereau of Dental Surgery, associated with the medical staff of the army.

Dentists of every land owe a debt of gratitude to a man who gave official recognition to the importance of their profession, and who extended to those under him every encouragement in the prosecution of their arduous duties; and no matter what differences may exist in regard to opinions honestly entertained, or a line of conduct dictated by a sense of duty, they owe more to Samuel Preston Moore, Surgeon General of the late Confederate States army, than to any man of modern times.

ARTICLE V.

Clinical Remarks

On "Schmidt's" disease of the Lower Jaw. At Surgeon Nelaton's Clinique. Paris.

Case.—Man aged 40 years. German—has been a worker in a match factory—his part of the work being to mix the paste formed of phosphorus and chlorate of potash, in which to dip the stems. This affection is especially common in Germany and its provinces, where the Congreve and lucifer matches are made on a large scale. The disease is produced by inhaling the vapors of phosphorus. The employees of the match factories are chiefly liable to it. It is really a necrosis of the inferior maxillary bone. After several months working over the warm phosphorus, the patient first feels a constant pain in the lower jaw, and ascribes it to some disease of one of the molar teeth of that side; though there may be and most often is no decay in it, the tooth is removed without relief to the pain in the jaw. This pain may be irregular or periodical—but it

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yields to no ordinary treatment. Soon necrosis of a portion of the bone becomes apparent, and a sequestrum is discovered, either in part or wholly detached—indeed it may fall out without any surgical interference whatever. When the latter occurs fistulous openings result, and are often long in closing. Strange to state, this disease is confined to the lower jaw, and is known only in workers in the paste referred to, and not in the hands engaged in other work in the same factory—nor in those whose business it is to manufacture phosphorus from bones for purposes of commerce. The obvious treatment is an early change of occupation and removal of the diseased sequestrum, with a course of tonics, good soft diet, and plenty of out-door exercise. A. A.

ARTICLE VI.

Decrease of Fecundity in Europe and America.

In a late number of the American Journal of Science and Art appears a paper which was originally read by Professor Storer of Boston before the American Academy of Arts and Sciences, about the close of the year 1858. Circumstances prevented its publication, but it is now brought before the people, who would do well to contemplate the startling facts it discloses. We shall go but slightly into details, confining ourselves to the general results.

It may be briefly stated that in Europe and America, there has been a marked and progressive decrease in the number of living births. In Sweden it has diminished by one ninth in sixty-one years, in Denmark by a quarter in 82 years; in Prussia by a third in 132 years, in England by two sevenths in a century; in Russia, by an eighth in 28 years; in Spain, by a sixth in 30 years; and in France by a third in 71 years. In France, for example, the rate of increase from 1801 to 1806 was 1.3 per cent. annually, while from 1806 to 1846 it had fallen to about a half of

one per cent. The progressive character of this dimunition may be seen by the following official figures, given in round numbers. The increase from

1841—1846	was	1.200,000
1846—1851	"	380,000
1851—1856	"	256,000

In this country, it is quite as bad. Thus, in Massachusetts, the entire increase is due to the foreign population, the native population being either stationary or decreasing. In 1850, the population of that state was 994,665, and the births 27,664 ; in 1859 the population was 1,132.369, and the births 32,845. Thus every 36 people in Massachusetts in 1850 produced one birth, and in 1855, 34 produced one birth. The proportion of births in France, in 1850, was one to 37.

This occurs too in the face of the fact that marriages are increasing, and the comforts of life are becoming more generally diffused through all classes. It is time to use plain language on this subject. Dr. Storer's statistics explain the disgraceful fact. The diminution is voluntary. The curtain of this infamous rascality is lifted for us by a glance at his tables.

We learn there that in New York in 1805, there was one still-born child out of every 1633 people ; while in 1849, there was one out of every 341 people living in that great city.

If we calculate the births in New York proportionally instead of by population, we reach the appalling result that in 1854 to 1857, one out of every eight infants was born dead. Now, as it is notorious that the public is acquainted with a very few of the cases of abortion, we are startled at the extent to which this murder of the innocents has been carried. Old Judea shuddered at one Herod. Modern America keeps one at every street corner. The horrible fact stares us in the face that child-murder has become a lucrative profession, and the very mothers themselves, are accessories before the fact in the villainous assassination.

A research into the proportions between abortions and still-births lifts still further the veil from this hideous mass of secret crimes. Tables of eminent obstetricians show that those proportions, in ordinary practice, are as 1 abortion to 78.5 still-births at full time. In New York, where it is certain that but few of the abortions were known, these proportions were as 1 to 4. The predominance in crime might well be supposed to be awarded to a great, rich, luxurious and dissolute city. But the State of Massachusetts, including the rustic population, has a far darker record. In that commonwealth, the proportion of abortions to still-births was 3 to 1 during the 14 years preceding 1855, while during the latter five years of that time, it was as 2 to 1. It is therefore 8 times worse than New York at its worst.

It must be borne in mind that we are not reading the records of illegitimacy; of women striving to hide their shame, at whatever cost to their offspring. These tables include the statistics of married life, and tell us that men and women, in comfortable circumstances, are in the habit of murdering their unborn children for base mercnaery reasons, to save the expense of a large and increasing household. It is a matter of simple justice to the Church of Rome to say that her communion furnishes but few and meagre items to this grand sum-total of rascality. She has set her face sternly and inflexibly against the monstrous villany, and the confessional enables her to enforce her righteous regulations in this respect. Hence the marked increase in population among her members.

ARTICLE VII.

Spontaneous Generation.

The question of spontaneous generation is one which has exercised the thoughts and pens of observers of nature from very early times. While one class of thinkers believed

it possible for common inorganic matter, under certain circumstances of heat, moisture, &c., spontaneously to assume living organic forms of plants or animals, others clung tenaciously to the dictum, *omnia ab ovo*, and insisted that a préexisting living germ was essential to all living being. Aristotle believed that whenever a moist substance became dry, or a dry substance moist, animals were produced, and we find some of the poets accounting for the renovation of animal life after the deluge of Deuscaleon, by the joint action of heat and moisture upon the prolific earth.

It is undeniable that our experience among the more fully developed animals and plants, would lead us to maintain the doctrine enunciated in the old Latin maxim we have just quoted, but when we come to those low organisms which hover upon the borders of vitality, we meet with difficulties not easily overcome. It is useless to speculate upon the ridiculous blunder of Mr. Crosse, of which so much use was made by the ingenious author of the Vestiges of Creation. Those of our readers who have perused that specious and shallow book, will remember that Mr. Crosse imagined that he had made acari by passing a current of electricity through a solution of silicate of potash containing a stone. Examination, however, showed that the electrical spider was simply the common *Acarus domesticus* a common pest of all dusty localities.

There are much lower forms than this, which are continually generated in infusions or solutions of vegetable or animal matter exposed to the air, over the true origin of which a discussion is still going on. Among the most common of these is our ordinary mould, which is in truth as well defined a vegetable organism as the mushroom. The yeast plant is another of these microscopic plants, which invariably makes its appearance when sugar is passing into alcohol. After the alcohol has been formed, and vinegar is in process of formation, another mycoderm, the vinegar plant or mother of vinegar makes its appearance. In the in-

fusions already alluded to, multitudes of vegetable and animal organisms are speedily formed.

It is to such rapid developements of life as these that the advocates of the doctrine of spontaneous generation are in the habit of appealing. They maintain that when all sources of error are avoided, these minute creatures still appear, while their opponents insist that something has been overlooked, and that these forms are regularly hatched from germs floating about in the atmosphere in the shape of impalpable dust. Several experiments had already shown that the existence of such spores was highly probable, but it was reserved for M. Pasteur, a chemist of note, to make the most conclusive researches upon this subject, which have yet been undertaken.

The first point was to prove the existence of these germs. To accomplish this, M. Pasteur drew a volume of air through a glass tube containing a plug of gun-cotton, which intercepted the particles of dust. Transferred to ether, that solvent completely dissolved the gun-cotton, and left the dust unattacked. This soon settled to the bottom, when it was removed and subjected to microscopic examination. It was found to consist of various abraded fragments of clothing, fuel, &c., and also of minute organized corpuscles, apparently spores of fungi and eggs of animalculæ. To prove their true character an experiment was undertaken. A mixture of a solution of sugar with yeast was boiled in a glass flask communicating with the air by means of a tube of platinum. In this way the air was driven out of the flask, and before it could return, the platinum tube was heated to redness. Thus all the germs were destroyed, and the air that entered was entirely free from living organisms. The flask was then hermetically sealed by fusing the glass neck. It was found that in this condition the solution might be indefinitely kept without any developement of vegetable or animal life.

If into such a flask a little of this dust already mention-

ed is introduced, and the flask be then hermetically sealed, the ordinary living forms are soon found. Attempts were made to collect air for these experiments over mercury, but they always failed, because this metal could not be freed from atmospheric dust containing germs.

Researches into the distribution of these germs showed that they were more abundant upon plains than upon high mountains. In all cases, air free from these germs cannot promote fermentation.

These experiments were very ingeniously varied and repeated a great number of times, so as completely to justify the conclusion of M. Pasteur, that the theory respecting the spontaneous formation of the lowest type of life is deprived of one of its essential foundations.

Donnè, however, has recently (August, 1866,) deserted the ranks of Pasteur and gone over to the advocates of spontaneous generation. He examined rotten eggs, and found that they contained no organisms. He made a hole in each with a red hot needle, and let part of the contents flow out, and then put the eggs into a pan of boiling water. Ten days afterwards, the drops of water taken from the surface contained no trace of living being, but the interior of the eggs were full of them. Donnè asks whence the germs could have come through the boiling water.

Pasteur replies that the temperature of ebullition does not necessarily annihilate the latent life of a germ, and cites instances of seeds preserving vitality after four hours boiling. Donnè in rejoinder, varies the experiment by letting out a third of the contents of the eggs as before, and instantly admitting boiling water, after which he seals the opening with wax completely closing all communication with the air.

An English observer, Dr. Child, has repeated Pasteur's experiments, but in spite of every "exaggerated" precaution finds organisms in eight out of thirteen experiments. He accounts for this discrepancy by supposing that the microscopic power used by Pasteur (350 diameter,) was not

high enough. He says that it requires a power of 1500 or 1700 diameters for the satisfactory investigation of these minute objects.

Thus the matter stands at present. The analogies of generation in the higher animals and plants are opposed to the theory of spontaneous generation, but no *a priori* reasoning can settle the question. The careful observations of facts alone can decide it.

CORRESPONDENCE.

ANSWERS TO QUERISTS. *Query 1st.*—What is the proper method for obtaining a correct impression of the mouth, for *partial upper* and *lower* sets of teeth? *Answer.*—Some depend upon wax impressions altogether, but as there are few who can obtain a perfectly accurate impression in wax of the mouth, especially where some of the teeth remain, to secure a well fitting plate, plaster of paris is a much more reliable material

Either of the following methods, if carefully observed, will secure as perfect an impression as could be desired. By Professor Austen's method very accurate impressions of all partial cases, as well as of special full cases can be obtained; it is as follows: "Take a wax impression and make a plaster model; in partial cases brush over the teeth of the model one or two layers of thin plaster, to fill up all undercuts, and to make the plate fit loosely; saturate the model with water and mould over it a gutta-percha cup; it should be on the inside from one-fourth to one-half an inch thick, so as to be stiff and unyielding." "The whole inside of the cup must be roughened up with a scaler or excavator in such a way that the plaster can take a firm hold." "In most partial cases the impression must be removed in sections, the inside remaining entire, but the outside and the parts between the teeth coming away separately." In very difficult cases, it is neces-

sary to partially cut through the cup so as to permit its removal in sections with the plaster adherent." "These cups have no handle, but are removed by inserting a plugging instrument into a small hole previously made in the back part of the cup where it is thickest."

Accurate impressions can also be obtained by means of an impression cup for each case, struck up with dies prepared from a wax impression and model.

The following is the method of Dr. Jas. B. Bean, by which he proposes to overcome the tendency of the thin film of plaster, and the frail edges of the impression to break away in taking it from the mouth. "A wax impression is procured from which a set of dies is made and a plate of thin brass swaged so as to approximate a fit, and be easily removed from the mouth." "The edges of this impression cup are trimmed so as to allow the muscles to assume their proper position; a handle is made by soldering a piece of stout brass wire across the plate, from one ridge to the other." "This plate is now warmed over a spirit lamp and coated on the inner surface and edges with gum shellac by rubbing a stick of this material over it while hot." "While the shellac is still in a fused condition, the plate is quickly transferred to a handful of raw cotton, which is wrapped about it and held against the melted shellac until it is cool."

"The superfluous cotton is then removed and the cup is ready for an impression." Very little plaster is necessary, and success is more certain and the impression is more perfect and reliable than with an ordinary impression cup; moreover the impression is very easily removed from the cast by first warming and removing the cup."

Query 2nd.—By what means would you prevent rubber from pressing into the joints of the teeth in vulcanite work? *Answer.*—This accident may be prevented by several methods: 1st. By the introduction of plaster of paris, in a dry state, between the blocks, and after well filling the spaces with the plaster in this condition, moistening it

with a drop or two of water, and working the thin paste thus formed, into the joints by means of a thin, flat pointed instrument.

This plaster should be allowed to harden before the process of packing in the rubber is commenced. The proper time for the introduction of the plaster is after the piece is invested and all the wax forming the temporary plate is removed; the plaster being introduced from the palatine or lingual surfaces.

Additional care may be taken, to prevent the rubber from entering the joints, by first introducing the plaster between the blocks from the labial and buccal surfaces; in the case of partial sets before the piece is placed in the flask; in the case of entire sets after the model and set are secured in the lower half of the flask. This precaution however, is unnecessary when care is taken to have the plaster, used for investing the piece, mixed very thin. The plaster will accomplish the purpose more effectually, if the spaces between the blocks are ground V shape, the greatest diameter being towards the palatine and lingual surfaces. Such a V shaped space will of course admit of a like shaped mass of plaster, and the pressure exerted upon this by the rubber will tend to wedge it more securely into the joint; whereas if the blocks are ground in such a manner as to give to the spaces between them parallel walls or sides, no such wedging can take place, and the rubber is much more liable to press into the joint.

2nd. By means of Robert's Os-Artificial. This material answers a good purpose for preventing the rubber from entering the joints. It is mixed very thin, and introduced between the blocks when the grinding of the teeth is completed.

Where this material is used the blocks should be closely ground, no space being left between their approximal surfaces; and after sufficient time has elapsed for the material to harden from twenty minutes to half an hour being required, the process of investing the piece can be proceed-

ed with. In all cases of vulcanite work it is well to allow the piece to stand from eight to twelve hours after it is invested, before the process of packing in the rubber is commenced. Such delay will allow the plaster to set perfectly, and there will be less danger of the teeth being forced from their proper positions by the pressure necessary to bring the parts of the flask together; this pressure should never be greater than what can be accomplished by the hand alone, without the aid of a lever. To obtain clear joints no little depends upon the quantity of rubber used in packing the piece, and when no more than what is requisite is introduced, hand pressure will, in all cases, prove sufficient to readjust the flask.

SELECTED ARTICLES.

ARTICLE VIII.

Ether versus Chloroform.

To the Editor of the Medical Record.

Sir—The death by chloroform which recently took place at Bellevue Hospital, gives a sad interest to the question of surgical anæthesia. The repeated accidents which have occurred in May, 1866, in Berlin; June, 1866, in Philadelphia; February, 1867 in New York, have naturally enough staggered the faith of many surgeons in the great anæsthetic.

Allow me, sir, to refresh the minds of your readers with reference to the past records of chloroform. As early as 1853, Baudens acknowledged eighty deaths, and A. Forzet found eighty-five. In 1859 Barrier de Lyon ascertained that there had been two hundred deaths. Diday collected from that date to 1864, twenty-one cases registered in England, leaving at least as many which were unrecorded. If there was another drug instrumental in the destruction of so many lives, would it not be ejected from the *materia*

medica? True, the fault has been put on the impurity of the article employed; but how often has chloroform been used in case of accident, in its purity, as in the instance of Bellevue; showing that it need not borrow its toxic properties from heterogeneous substances. Hence, from 1847, the date of the beginning of the use of anæsthesia, surgeons have been divided into two classes, the chloroformists and etherists; and though the first-named had, at first, the advantage, their rivals have steadily persevered, patient and unrelenting, in their efforts to demonstrate the general efficiency and the absolute safety of ether.

In 1848, Cantu remarked that half of his chloroformized frogs died, and hardly any of his etherized ones. Sedillor admits, at the same date, that when he stops giving ether, anæsthesia may continue, but in no case become aggravated. Not so with chloroform; when discontinued after insensibility is produced, its action is continued, its symptoms may in some instances cause death. This circumstance constitutes the most marked difference between the anæsthetic rivals.

The few men who supported this view against triumphant chloroformists found an early and eminent representative in T. E. Petrequin, chief-surgeon of the Hotel de Lyon. For nearly twenty years he has banished chloroform and used ether in that hospital, the largest in France, where from fourteen to fifteen thousand patients are treated annually, and where more operations are performed than in any other. From this telling experience, Petrequin Diday, and in fact l'Ecole de Lyon, asserts that pure ether has accomplished in their hands, without accident, those services which chloroform has rendered elsewhere at a cost of several hundred lives. Is not this question worthy of further study? Yours, etc.,

E. SEGUIN, M. D.

—*The Medical Record.*

ARTICLE IX.

Dr. Mary Walker.

The notoriety which this mannish female has succeeded in obtaining both during and since the war, has excited a very natural curiosity in reference to her past history. Her true place is so well fixed by a medical officer of the Federal army, that we should injustice to him by an extract. We therefore give his letter entire from the New York Medical Journal for May.

The following communication comes from so respectable a source that we publish it without hesitation :

CINCINNATI, OHIO, January 20th, 1867.

Editor of THE NEW YORK MEDICAL JOURNAL.

I observe in the January number of your JOURNAL a page or two devoted to the experiences of Dr. Mary Walker in London. The various newspapers throughout the country have, for the past year or two, contained notices of this person, and a great degree of confusion has arisen as to her real merits, her services in the army, and her position in the medical profession. As I have happened, in the way of official duty, to learn something from this woman herself, I beg to put your readers in posession of my information.

My first observation of Dr. Mary Walker was made at Lincoln General Hospital, Washington, to which she came, in some pretended inspectorial capacity, armed with a pass from Secretary Stanton. The particular function intrusted to Mary Walker seemed to be that of a spy and informer; at all events, she pretended to have power of obtain redress of grievances, and industriously sat about hearing and contriving them. At this period, she was dressed in that hybrid costume which has since become so notorious.

My next encounter with Miss Walker was at Chatta-

nooga. She was sent out by the War Department, through Acting Surgeon-General Barnes, to Assistant Surgeon-General Wood at Louisville. Dr. Wood, it is to be presumed, under instructions from Washington, sent her forward with orders to report to Surgeon Perin, Medical Director of the Army of the Cumberland, she presented herself to Dr. Perin and demanded employment as a Medical Officer. He was not a little astonished at the apparition, and, I may add—I trust without damaging his reputation with the powers that be—indignant that the lives of sick and wounded men should be intrusted to such a medical monstrosity. Before assigning her to duty, which he resolved not to do, he ordered a medical board to examine into her qualifications, as a justification for his decision. I was a member of that Board. *Dr.* Walker presented herself for examination, with a little feminine tremor and confusion, and before settling down to the graver business of the medical examination, tried to propitiate us and secure a favorable report, so that we might take it for granted she possessed the requisite knowledge. She betrayed such utter ignorance of any subject in the whole range of medical science, that we found it a difficult matter to conduct an examination. The Board unanimously reported that she had no more medical knowledge than any ordinary housewife, that she was, of course, entirely unfit for the position of medical officer, and that she might be made useful as a nurse in one of the hospitals.

During the examination, we learned various particulars of her history, which I forbear to mention. She had a diploma, she said—we did not see it—from a "hydropathic institution" at Geneva, N. Y. She had never been, so far as we could learn, within the walls of a medical college or hospital, for the purpose of obtaining a medical education.

The spectacle was both ludicrous and sad. Her pretension, her ignorance, her sex, her unprotected situation,

all appealed strongly to our sympathies, and we treated her with the utmost delicacy and consideration. How little ground there was for our feelings of sympathy will appear in the sequel. In a day or two after the examination, she was assigned to a hospital as nurse, but had not entered upon her duties, when an order came from Department Headquarters, sending her to the extreme front! We learned, in a few days, that she was riding about the outposts, and when riding alone, one day, she ventured too far, and was captured and forwarded to Richmond, being treated with considerable rigor, notwithstanding her sex and her claim to the privilege of a medical officer.

It appeared subsequently that this was the design. She was intended as a spy, and went forward to be captured. It was supposed that her sex and *profession* would procure her greater liberties and wider opportunities for observation than were at all possible to other prisoners. The medical staff of the army was made the blind for the execution of this profound piece of strategy by the War Offiice—another instance of the esteem in which medical officers were held by the Hon. Secretary of War.

ROBERTS BARTHOLOW,
Late Assistant-Surgeon (Captain) U. S. A.

MONTHLY SUMMARY.

Heat produced by Mental work.—Dr. Lombard, assistant professor of Physiology in Harvard University, has published a paper in a recent number of the New York Medical Journal, in which he attempts to show that mental work increases the heat of the head.

For the purpose of his inquiries, he employed a thermo-electric apparatus capable of indicating exceedingly minute variations of temperature, less than a thousandth part of a centigrade degree. He chose himself as the subject of his experiments which extended over the space of a year. His first effort was to determine

the normal temperature of his head, when at rest from all mental work. In this he found much variation, the temperature being sometimes steady, at others rising and falling, often with considerable rapidity. Inquiry into the source of these variations satisfied him that when the temperature was unchanged his mind was in a torpid condition, while in the other case, it was more or less occupied. Attention to conversation was sufficient to increase the heat of the head. It was evident that no augmented action of the heart could account for this phenomenon, as the temperature of other parts of the body more favorably situate for feeling such influence than the head, remained unchanged.

Exercise of the reasoning powers heated the head to the extreme extent of one twentieth of a degree of the centigrade thermometer, and this elevation was accompanied by a depression of the temperature of other parts of the body. The emotions, however, were found to be more powerful excitors of the brain. Reading poetry which roused the interest and excited the sympathies, was the most active of all the means he experimented on, the temperature being more elevated by a few minutes recitation than by hours of deep thought.

The statement of these results shows the author to be rather unfortunate in his phraseology. Strictly speaking this is not *mental work* but *emotional excitement.* The tendency of blood to the head during strong emotion is well known. In this same number we find some illustrations of this fact. Dr. Howe of Philadelphia, reports a case of fracture of the skull, in which the operation of trepanning exposed a considerable portion of the brain. Observations on this showed that during sleep, the membranes did not protrude so far as while the boy was awake, and that the pulsations of the brain were more feeble, indicating a lower vascular activity. The more active and energetic the emotions, the greater the protrusion of the brain. On several occasions, when the child was frightened or angry, the parts were much pushed out, and sometimes the distension was so great as to produce slight hemorrhage.

Gases in Meteoric Iron.—Prof. Graham of the English Mint has investigated the gases contained in meteoric iron, and has reached some remarkable conclusions. He finds that a pure mal-

leable meteoric iron, of specific gravity 7.79, gives off when heated in a vacuum for 2½ hours, 2.85 times its volume of gas, composed as follows:

Hydrogen	85.68
Carbonic Oxide	4.46
Nitrogen	9.86
	100.00

It contained not a trace of carbonic acid, nor any hydrocarbon vapour absorbable by sulphuric acid.

Now, as it is known that iron is capable of absorbing or including gases from an ordinary fire, Graham made a comparative test, selecting clean horse-shoe nails as the substance to be operated upon. He found that, when similarly heated for 4½ hours, they gave off 2.66 times their volume of gas having the following composition.

Hydrogen	35.0
Carbonic Oxide	50.3
Carbonic Acid	7.7
Nitrogen	7.0
	100.0

The difference in the constitution of these gases is very marked. It consists chiefly in the great excess of hydrogen, the small proportion of carbonic oxide, and the absence of carbonic acid in the air expelled from meteoric iron. It reveals a totally different constitution of the atmosphere in the remote regions from which it has come. It is no easy matter to impregnate iron in our atmosphere with its own volume of hydrogen, but this meteoric iron gave up three times that quantity without being fully exhausted. It must therefore have been fused in a dense atmosphere of hydrogen gas. Now the spectroscope reveals to us the presence of hydrogen in large quantity in the fixed stars, so that we may regard this hydrogen as imported to us from starry realms far beyond the limits of the solar system.

New Treatment of Necrosis.—A letter from London to the *Richmond Journal* informs us that a new treatment of necrosis has been introduced by Sir William Ferguson. Ordinarily the

bone is let alone till the dead is separated from the living portion, after which it is removed. By this plan, the sequestrum is often allowed to be nearly completely enveloped by new bone. Sir William Ferguson, on the contrary, as soon as necrosis is detected, cuts down at once upon the diseased bone, dividing the periosteum. This prevents the formation of new bone under the severed periosteum, and facilitates the removal of the dead portion.

Hydrophobia.—Professor St. Cyr, of the Lyons Veterinary School, corrects some popular errors touching this frightful disease. He tells us:

1. The disease in dogs has no definite period of incubation, which varies from 16 to 115 days, and the short period of 2 or 3 days, spoken of in rural districts has no foundation in fact.
2. Bitches are as liable to hydrophobia as dogs.
3. Dogs are more liable in proportion to the wandering character of their lives.
4. Hot and dry weather does not favour the occurrence of canine madness, the rainy months producing more cases of the disease.
5. No cause but contagion is known.

The period of incubation in man is known to vary. A case has recently been reported in Liege, in which the time of the poison was clearly ascertained. The man was attacked with hydrophobia one year and six days after the application of the rabid animal's saliva.

New Base for Artificial Teeth.—Dr. G. F. J. Colburn, of Newark, N. J., has invented a substitute for rubber in dentistry, which promises to be of much value to the profession. It is in reality a cement of which the mineral asbestos is one of the ingredients. Asbestos is a very peculiar substance. It it excedingly light, and so very fibrous in its nature that it may be spun and woven like cloth, in which condition it resists fire, water and many of the acids with complete success. Taking advantage of these natural qualities Dr. Colburn has by long study, discovered additional substances, which, when united, form an artificial base that posesses remarkable toughness, adherence, strength and lightness. The ease and freedom with which it can be molded is a strong recommendation. It can be readily applied to gold,

platinum and other plates. We have seen some full sets of teeth on aluminum plates that were truly beautiful. This new base contains no ingredients injurious to the health of the mouth or system. It is not affected by acid secretions, is free from all taste, and is inodorous. We hope that its merit, will be thoroughly tested. Patents have been allowed.

EDITORIAL DEPARTMENT.

Practice vs. Theory.—Few men have thrown greater obstacles in the way of scientific progress than those who are perpetually vaunting themselves to be exclusively practical. The narrow horizon of their individual experience shuts them in, and they cannot be brought to believe that beyond the limits of their native valley, and out of sight of their own chimneys' smoke, there is a great world full of mighty energies and prodigious works. Because they cannot see the immediate bearing of scientific research upon their daily life and its ever recurring labours, they disregard and deride all disinterested inquiry into truth. How often do we hear the cry "*cui bono*" raised in reference to mental labours, and how often in the progress of the world has its absurdity been shown.

The truth is that, in many respects, the exclusively practical man is singularly unpractical. He has a set of rules by which he works, without knowing anything of the foundation on which they rest. Thus he very often is guided by the worn-out fallacies of old speculations. A superstitious adherence to formulæ, he imagines to be practical independence. How many practical farmers of the present day consult the almanac to know the proper sign in which to sow their wheat, or plant their turnips. How many more have wise saws about the quarters of the moon in which to kill their meat or set their potatoes. And how astounded and incredulous they are when told that these formulæ which they imagine to be practical rules, are in truth the merest dreams of the oldest and most extravagant theorizers in the world, the astrologers of Chaldea;—vain imaginations which have long been set aside by men of science. So too it would be easy to show that many of the popular notions of medicine are derived from exploded theories, such as the old humoural pathology, or the doctrine of signatures, or some other equally wild and absurd speculation. The truth is that the general public attires itself in the cast-off garments of science, and is usually a century or two behind the times.

Now we do not mean to deny the value of experience, provided it be real and not imaginary. Unfortunately, however, much that claims to be experience is really made up of a very few imperfectly observed facts, mixed with a vast amount of utterly false reasoning upon those facts, and much superstition, often descending from a remote antiquity. True experience always goes hand in hand with science. Indeed, science, in the proper acceptation of the term, is nothing else than the orderly arrangement of the world's experience.

It is no answer to such statements to say that art is always in advance of science. In the first place, the statement is true only to a limited extent and for a limited period of the history of art. The first efforts both of science and art are tentative. Art searches out the secrets of nature, feels after them as it were. It tries first one method then another, and after a variety of blind endeavours, finally hits upon a desirable combination. All that the artist knows, however, is that his process works well. The moment he leaves his empirical formulæ and begins to inquire into the reason of success or failure, he trenches upon the domain of science. It is here that science begins. Arranging the materials provided for her by her elder sister, she inquires into cause and effect, and discovers the shortcomings of art. Criticism becomes possible, and gives light which mere empiricism never could evolve.

To illustrate from a familiar art, that of the dyer. For a long time it was a mere collection of formulæ, and each man worked by a routine marked out by his predecessors. In these latter days, however, chemistry has begun to study the substances employed by the dyer. The action of mordants is now understood, the changes affected upon the dye-stuffs by different chemical reactions have been made known. Wider research has extended the knowledge of the tinctorial resources of nature, and refuse material hitherto useless, has been made to yield tints of unsurpassed delicacy and splendor. The whole art has been revolutionized and reached a degree of perfection which never could have been obtained without the aid of science.

It is clear then, that while art has its special functions to perform, and must always precede science, it can never reach its full perfection without the aid of the latter. How idle then to object, as many do, to the minute inquiry into all the phenomena of the world. How absurd the perpetually repeated cry of *cui bono!* How ridiculous to the practical man, the man of formulæ and routine, must have appeared the chemists' researches into the combinations of the radical formyl. Yet out of these inquiries came chloroform, the greatest boon of modern surgery to suffering humanity.

Such results should caution people to beware how they condemn hastily inquiries of which they do not see the immediate practical bearing. Every truth is valuable because it is truth, and all the phenomena of the universe should be carefully studied. Truth is precious even in its fragments, and he who begins by despising it in its humble manifestations, will end by scoffing at its loftiest developements. The new fact may be neglected at first, may be overlaid with rubbish, sunk out of sight, forgotten, but the perennial vitality of truth is in it, and it must arise out out of its ashes, vigorous and glorious. So the acorn is trodden under foot, hidden in leaves, buried in the soil, but in time it shall force itself upon the notice of men, no longer an insignificant nut, but a great spreading tree under whose cooling shade, generations yet unborn may refresh their weary limbs.

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ORIGINAL COMMUNICATIONS.

ARTICLE I.

Essential Nature of Caries. No. 1.

By H. R. Noel, M. D., Professor of Physiology,
Baltimore College of Dental Surgery.

Separation being true prophylaxis, what is the "Essential Nature of Caries"? Is it a vital process intrinsically? Is it a physical or chemical process intrinsically? Is it a blending of the two? We shall endeavor to answer these questions, and elicit the physiological explanation of the facts given us by observation and practical experience.

To fully grasp this subject, it is necessary that we have clear ideas of the minute anatomy of the teeth; but the limits of this article preclude an elaborate discussion of their histology. We shall however give a brief but comprehensive description of their microscopic structure, both as regards views formerly entertained, and views more recently advocated, as results of the most rigid investigations with the highest powers of the microscope. These views are widely and essentially different, and we would here suggest a close and careful attention to each, as we produce them. We shall assume much as already known,

and give only the veriest essentials in our descriptions. But even then, we shall be compelled to introduce much that is uninteresting except to the thorough student, dry details of microscopic appearances, as given by different observers.

General character of Dentine, Enamel, and Cementum.

1. Dentine consists of microscopic tubules, opening by their larger ends into the cavity of the pulp, and radiating in lines perpendicular to the walls of this cavity towards the periphery of the tooth. The diameter of these tubular rods at their larger ends is 1.4500th with a bore of 1.10000th of an inch; at the peripheral ends, which exhibit numerous branches, they are immeasurably fine. Intertubular substance faintly granular.

2. Enamel prismatic *solid* fibres, so closely packed, that there is no intervening material; prisms four or six sided, adhering by one end to dentine and free by the other; 1.5600th inch in diameter.

3. Cementum has characters of true bone.*

1. Dentine.—Every part of the surface of the pulp cavity is pierced by microscopic pores, about 1.10000th of an inch in diameter, which are orifices of tubes radiating from the pulp cavity to the periphery of the dentine, with a general direction vertical to that surface. These are the dentinal tubes.

Thin sections of dentine taken across the tubes viewed by transmitted light with a five hundred times linear magnifying power, show the clear area of the tube more or less occupied by a dark, sub-granular, opaque calcareous substance; and a clear border to the area, neatly defined from the intertubular substance, and indicating the proper parietes of the tube (i. e. marking the distinct outline of calibre and walls, tube and intertubular substance.)

"If the tubes were described according to the order of their formation, the *peripheral extremities* would be their *beginnings*, and the dichotomous

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*Syllabus of Lectures on Physiology. By Prof. J. C. CEABELL. W. Va., 1853.

divisions would rather be the *anastomores of the more numerous and smaller tubes* as they gradually converge to terminate by *fewer and wider extremities*, in the pulp cavity." Odontography pp. 459—60—61. Richard Owen.

2. "Enamel of the human teeth consists of long and slender, solid prismatic, for the most part hexagonal, fibres of phosphate, carbonate and fluate of lime."

"Each fibre is 1.5000th of an inch in thickness, and is marked throughout its entire course by faint, close set transverse striæ."—Idem pp. 464 and 465.

3. "Cementum.—This third substance is thinnest upon the crown, and very gradually increases in thickness as it approaches the end of the fang; it is only on the implanted part of the tooth that the radiated cells which demonstrate the close analogy between cementum and bone exist: elsewhere the clear basis of cement above is present, and this is soon worn away from the enamel of the crown. There are no vascular canals in human cement except where it happens to be abnormally thickened. The chemical composition of both the animal basis and earthy salts of this dental tissue and of bone are identical. Cementum cells oblong, circular, fusiform, have an average diameter of 1-2000th of an inch: and the fine radiating tubes diameter 1-2009th of an inch.—*Idem* 466 and '67.

1.—"Dentine is made up of two distinct parts, dentinal tubes, and an intertubular tissue. The course of the tubes bending, curving, undulating, branching, anastomosing, &c., as they approach the enamel, have short, transverse, dilatations at tolerably regular intervals."—*Tomes' Dental Phy. and Surgy.*, pp. 32 and 34.

"When measured by the micrometer, the internal diameter of the largest tube is about 1-100000th of an inch; and diameter including parieties 3-10000th of an inch."—*Idem* p. 39.

Mr. Tomes' diagrams show distinctly the outlines of calibre or bore, walls, tubes and intertubular substance corresponding with Mr. Owen in every particular.

2.—"Enamel is composed of semi-transparent fibres placed side by side and closely united. Their form is an approximation to a six-sided prism, and their size tolerably uniform, being from the 2.1000th to the 3.10000th of an inch in diameter."—*Idem p.* 53.

Dentinal tubes may be sometimes prolonged into the enamel, and the fibre may then be hollow instead of solid, but this is rarely found in adult teeth.

3.—"Cementum.—The general description of the structure is equally applicable to tooth bone and osseous tissue."—*Idem* p. 58.

The above views are those which obtained for many years, but we shall find that they are in some respects radically erroneous. Mr. Tomes in a more recent work, "Dental Surgery," has so far modified and changed his views as regards the microscopic characters of dentine, that some opinions formerly supported, are now utterly abandoned. He still acknowledges the solid character or prismatic form of the

enamel rods, columns or fibres and their cross striæ. As regards the dentinal tubes, there is a most important and radical change, for instead of open tubules as before described, he has now a description, clear and forcible, plain and satisfactory, of soft, fleshly fibrillæ running from the pulp to these tubes, filling these tubes, and ramifying as the tubes do. There are therefore, in the dentine in a perfect state of health, as when the tooth occupies the normal relations in the mouth, *no open tubes bearing fluids.* But we have fleshly fibrillæ running from the peripheral surface of the dentine back to the pulp, and these fibrillæ are vitally and organically continuous with the intimate structure of the pulp proper.

The descriptions of the tubes, their dichotomous divisions, anostomoses, branchings, &c., answer equally as well and are as perfectly accurate as regards the fibrillæ in question. We should not say, that the pulp tissue proper sends out prolongations of soft, solid or semi-solid fibrillæ, which fill the spaces formerly supposed to be tubes in the dentine, and extend to their ultimate ramifications, and their minutest subdivisions; but beginning at the point, the periphery, *we would rather say*, these fibrillæ run from *periphery* to *pulp*, and in this we agree fully with Richard Owen as regards the formation, of what he terms the tubes. As we proceed this idea will be more clearly developed. There are no tubes in dentine—so far as we are able to ascertain by the present powers of the microscope, and though this may seem a rash assertion, we hope to be able to demonstrate its truth.

Mr. Tomes has succeeded in making many preparations, that do seem to absolutely demonstrate the non-existence of tubes, but invariable presence of fibrillæ in the dentine. Dr. L. S. Beale has also specimens, which he thinks, substantiate Mr. Tomes' statements.

So far as our microscopic knowledge extends, these statements cannot be, or at least have not been refuted, and are acknowledged by our best authorities to be absolutely true.

The presence of these fibrillæ modifies our physiological views as to the structure of the teeth, their vitality, liability to changes, &c. There is a point of some interest here —it is one mentioned by Mr. Tomes, and regard the microscopic appearance of a piece of carious dentine.

"Under the microscope the section looks as though it might have been built up of multitudes of *tobacco-pipe stems*, united by an intervening substance."—*Dental Surg.*, p. 358.

The intervening substance was *decaying first*, and not the walls of the so-called tubes, or the fibrillæ.

"As regards enamel the *central portion* of the rods gave way first, or suffered first from caries."—*Idem* p. 356.

The point of interest is one to be remembered, as we shall have occasion to refer to it again, and also to use it in an argument against the vital theory of caries.

The intertubular substance of dentine, and the centres of the enamel rods first become carious.

As regards the developement of the different structures, we shall assume, that the generally received opinions are perfectly familiar to our readers ; and as we have too little space, to review the opinions of Raschkow, Kolliker, Sent, Nasmyth, Huxley, &c., we shall give a concise and brief notice of the subject, following Tomes and L. S. Beale as the latest and best authorities. There are certain ideas connected with the developement, which believing to be utterly false, we shall ignore, and if referred to at all, it will be in a very casual manner. A careful study of both Tomes' and Beale's works seems to give the following as correct.

The dental pulp is not itself calcified. The performative membrane of Raschkow, Huxley, &c., and the membrane of Nasmyth are one and the same, belonging to the cementum ; and it appears from direct microscopic examination, to be but the uncalcified remains of a membrane that served in the production of the cementum. Both dentine and enamel are formed from elongated, nucleated bodies which have been spoken of as cells, and

look like nucleated, columnar epithelium. This is in direct opposition to Huxley's views.

"Cylindrical columns having one or more nuclei, with a certain number of spherical or ovoid nucleated cells bathed in fluid, will be seen to make up this gelatinous matter. Again if the inner surface of the sac be examined by removing a small piece and placing it in fluid in the field of the microscope, we shall see that minute columns similar to those found in the gelatinous substance cover the surface. This is the enamel organ or enamel pulp, from which the columns found in the gelatinous substance have been detached."—Dental Surg. pp. 307 and 308

These are between the internal surface of the sac, and the external surface of the papilla, or coronal surface of the young tooth. Kolliker states:

"The dental sacs consist of consecutive tissue, in which vessels and nerves are distributed; from their base proceeds the dental pulp, which in form resembles the tooth to which it belongs, and consists of an internal portion rich in vessels and eventually in nerves also, and a nonvascular external portion. The latter is bounded by a delicate, structureless membrane, the membrana preformativa (Raschkow,) which has no further relation to the developements of the tooth. Beneath this lie cells of 0.016 to 0.024''' in length, and 0.002 to 0.0045 in breadth, with very beautiful vesicular nuclei, and distinct single or multiple nucleoli; they are arranged close together over the whole surface at the pulp, like an epithelium, though not so sharply defined internally as it would be, but gradually passing, at least apparently by smaller cells into the parenchyma."

We see the unity of description here and the clearness of it, leaves no doubt that these three observers (Kolliker, Tomes, Beale,) are correct upon their main point, i. e. the presence of columnar cells, as entering invariably into the formation of dentine and enamel. The membrane described by Kolliker has no actual existence as a distinct structure, but the elongated nucleated cells, or bodies, are mentioned by all three, they are therefore a common element of description.

Dr. L. S. Beale makes some very instructive statements and throws a great deal of light upon those obscure changes going on between the sac of the tooth and papilla or dental pulp. The changes occurring here are consummated in the production of enamel and dentine, and both are produced from columnar cells, fibres, rods or bodies, by calcification; the cells or rods, &c., spring from the dental pulp and from the walls of the dental sac alike,

hence they must meet upon some half way ground. The nucleated rods, that are to form dentine, obtain nutrient plasma from the pulp ; the rods or cells for the enamel obtain the plasma from vessels ramifying on the walls of the sac, and would appear to approach each other as they develope, until the line of demarcation between enamel and dentine is reached. The calcification of the nucleated bodies, rods &c., gives the true enamel and true dentine.

"Before any dentine is formed, and immediately beneath the dentine last formed at all ages, between it and the vascular and nervous pulp is a layer of what looks something like columnar epithelium."

"This tissue consists of elongated, cylindrical bodies, or cells with nuclei, placed at right angles to the outer surface of the pulp. Although the pulp diminishes in size as the formation of dentine proceeds, the pulp does not become dentine ; but this dentine results from changes occurring in a tissue which lies upon the surface of the pulp. This consists of cells like columnar cells. These elongated cells are not separated from the nerves, vessels and connective tissue of the pulp by a demonstrable basement membrane, but their extremities pass amongst the fibres of the connective tissue, and in some instances seem to be continuous with them. It is possible that some may be continuous with the so-called connective tissue corpuscles. As new dentine is formed these cells encroach upon the pulp, the constituent tissues of which gradually diminish in amount." —Structure, Growth and Life, pp. 182, 183.

We notice here that Beale denies the existence of a demonstrable basement membrane between the pulp proper and the "columnar cells," though Kolliker asserts its existence, they agree as to the existence of these cells, bodies, or rods; Tomes favors the view advocated by Beale and the weight of evidence is certainly in their favor. The organic continuity between these cells and the tissue of pulp proper, throws a light upon the significant fact of the organic continuity of the fibrillæ of the dentinal tubes and pulp tissue. We shall endeavor to show, the direct bearing of this fact, when we discuss the properties of these fibrils or fibrillæ. Between the pulp and dentine already formed, there are at all ages and times, some of these "cells" or columnar bodies, and we find that dentine is being constantly though slowly formed, and the pulp cavity therefore diminishing. The greatest amount of vital change and transformation is therefore between the pulp and dentine ; and we shall also find these or similar "cells" between the cementum form-

ed and membrane investing, hence cementum may increase in amount also. Does caries ever occur at these points?

The elongated bodies, cells, or rods, are the structural elements, that calcified, become dentine and enamel. Those that are to become dentine have a direct organic continuity with the tissues of the pulp, and are nourished from the vessels of the pulp. Those that are to form enamel have a direct organic continuity with the internal vascular surface of the membrane lining the tooth sac, and are nourished from the vessels of this lining membrane. These "cells or prisms," "nucleated bodies or rods" are first formed and then the deposition of inorganic matter takes place, and calcification is the result. The first step is purely vital,—the second probably chemical, or at best, only chemico-vital. These "cells," "rods" "prisms" or "nucleated bodies," (as various writers have thought proper to name the same anatomical element to suit themselves, i. e. these structures between papilla and sac, and connected with both) are undoubtedly vitalized structures, but when once thoroughly calcified, we would respectfully ask are they still vitalized? This is a delicate point and shall be thoroughly discussed.

When calcification takes place the first portion of the "cells" calcified, are those ends where enamel and dentine unite. The "cells" that are to form dentine, calcify at their peripheral ends first, and the calcification gradually extends towards the pulp; on the other hand those cells that are to form enamel, begin to calcify exactly on the line of union between dentine and enamel, but here the calcification extends outwards and towards the vascular membrane lining the tooth sac. Commencing at a common point the process in the two cases proceeds in exactly opposite directions. The last formed portions of enamel are the peripheral ends of the "rods," upon the crown and sides of the tooth. The last formed portions of the dentine are those rods or ends next to the pulp, and the portion next to the fibrils or fibrillæ, i. e. the internal surface

of the so-called walls, as seen in the dry tooth. In fact dentine is being formed and fibrils are diminishing in size, pulp cavity diminishing size throughout the life of the tooth.

The "cells" or "elongated bodies," in the case of enamels, begin to calcify first on the exterior of the cell, or what might be called the cell-wall, and the calcification extends into the centre of each prism, but the centres calcify more slowly than the exterior or outer portion of the rod.

(To be Continued.)

ARTICLE II.

Animal Electricity.

Popular ignorance is the fruitful soil in which all manner of humbugs germinate speedily, grow rapidly and fructify abundantly. Yet it is not absolute ignorance which furnishes so kindly a soil to mushroom theories and fungous sham science, but rather that half-knowledge, in which native stupidity has been fertilized by the offal of science, rejected by its true votaries and descending, like the cast off clothes of beaux and belles, through various grades of society, to its ultimate destination, the rubbish-heap.

Nowhere has this half-learning, which is really the worst ignorance, revelled to such an extent as in the department of electricity. Every unaccountable phenomena is supposed to be explained by the simple utterance of the talismanic word, electricity. Does a table tip, or a heavy piano walk up stairs at the bidding of a medium, electricity is supposed to be the motive power. This physical force is to the sciolists of our day, what magic was to the more honest ignoramuses of the past. The less they know of it, the more willing they are to invoke its aid, and the more tremendous are the occult powers they attribute to it.

It is a very comical physiology which these electroma-

niacs have rendered popular among the so-called educated people of this continent. It is no easy matter to reduce these ravings to definite form, and we shall not attempt it. All our readers, however, must have heard statements from peripatetic lecturers that the brain was the positive and the stomach the negative pole of a great galvanic battery, and that by the electrical reactions of these, nervous fluid or life was generated. Electroquacks professed to heal all the ills of mortal life by cunningly devised currents of electricity, to drive disease from point to point till it was ultimately hounded out of the system; and a generation which prides itself upon its enlightenment, actually believed all this unmitigated nonsense.

Animal electricity has also been misunderstood by men who are greatly superior to these quacks and their gulls. When Galvani had published an account of his famous experiment on frogs, the scientific world was greatly excited at the new discovery. It was fondly imagined that electrified plants grew with unwonted vigour, that the soil could be fertilized by electricity, that an amalgam of zinc could perform the normal functions of an animal's brain. The electrical phenomena produced by rubbing with the hand the back of a living cat were supposed to demonstrate the existence of vital electricity, whereas in truth the very same manifestations are obtained when a dry warm cat-skin is substituted for the living animal. The currents, which the galvanometer shows to exist when one end of a wire touches the interior of the mouth, and the other the skin of the face moistened with perspiration, were explained in the same way; but we know that sweat is acid and saliva alkaline, and that a current always takes place from an alkaline to an acid fluid when the proper connexions are made. The thickening of the white of an egg along the course of an electric current was supposed to be the commencement of organization, but in reality, the albumen was simply cooked hard by

the heat of the current, as it would have been by that of an ordinary fire.

In a similar manner may we account for those higher manifestations of a supposed connection between electricity and organization. Thus the peculiar circulation of the chara, an aquatic plant, is stopped by the electric current, but who knows what coagulation of the juices it may have occasioned? Seeds, frequently exposed in the focus of an ordinary electric machine, germinate more quickly than others, but in that focus *ozone* is always generated, and ozone notoriously promotes germination. So too, upon a piece of cloth moistened with a saline solution, small seeds exposed to an electric current have been found to germinate more rapidly at the negative than at the positive electrode. Now this is only an indirect action of the electric force. The current decomposes the saline solution, developing the alkali at the negative and the acid at the positive electrode, and alkalies favor germination, while acids retard it.

In considering real electro physiological phenomena, the *electric shock*, that is, the pain and involuntary muscular contraction which occur when an electric current is passed through a living person, naturally presents itself, as one of the most familiar of these manifestations. Now contractility is an inherent muscular property, the immediate cause of which we do not now propose to consider. A striking proof of this fact is an experiment of Matteuci, to whose lectures in Turin we once for all acknowledge our indebtedness for the facts and most of the principles of this article. He took two frogs one of which was killed by mechanical violence, the other poisoned by *curare*. A current sent through the nerves of the former, produced violent contraction, but when passed through those of the poisoned frog, no contraction took place. The muscles, however, instantly contracted when the current was passed through them.

One of the marked phenomena of the shock is that the

pain is chiefly felt at the articulations. This is due to the conditions of electrical transmission. Moist skin receives and conveys the shock more rapidly than dry; muscle, being full of blood and saline solutions, transmits electricity five or six times better than nerve. On this account the section of the conductor is greatly narrowed at the joints where the muscular mass is smaller or nearly absent, and the electric tension in the nerves at those points is much greater than where they are imbedded in a large collection of muscular fibres.

The rapidity and force of muscular contraction have been carefully measured. It appears as the average of numerous observations, that at the beginning of the experiments on recently killed frogs, while the vitality of the muscle is still considerable, the duration of the contraction is 1.100th of a second; the entire contraction, (i. e. the contraction and relaxation) occupies $\frac{1}{4}$ to $\frac{1}{3}$ of a second. A very strong electrical discharge will keep up the contraction longer, and sometimes render it permanent.

In considering these phenomena, it is necessary to bear in mind that physical and chemical phenomena are not brought about under the same conditions as vital manifestations. The quantity of water decomposed, for example, or the amount of heat generated by an electrical current depends upon the quantity of electricity passing in a unit of time. The physiological phenomena of contraction and pain, however, occur only at the beginning and ending of the passage of the current. It is not therefore the quantity of electricity which produces these phenomena, but the variation of the electric condition of the nerves and muscles at the moment of opening or closing a voltaic circuit. By a series of repeated shocks, it is possible to exhaust nervous power and kill the animal, though the current itself may be quite weak.

So susceptible are the nerves and muscles to this change of electric condition, that they are far more delicate indicator of the presence of electricity, than the most accurate

electrometer. A Leyden jar discharged repeatedly by a metallic arc, and which fails to effect the nicest electroscope, will nevertheless excite contractions in the muscles of a frog. The quantity of zinc consumed in the battery, bears no proportion to the amount of muscular contraction induced by it. In all merely chemical and physical phenomena of electricity, there is a simple and definite relation between the result obtained and the amount of zinc consumed in the battery. And this relation is expressed by the equivalent of the heat developed during the consumption of the zinc. Now when we compute the mechanical effect of muscular contraction induced by a galvanic current, we find that it is some thirty thousand times greater than this heat-equivalent. Evidently then, there is a new force developed, just as the spark applied to gunpowder produces an effect far beyond any power residing in itself, by inducing a new combination of elements already existing in a quiescent condition.

The evidence of the independence and muscular origin of this contraction may be gathered from the following considerations. An experiment with dead frogs suspended from wires in bottles, shows that the exhalation of carbonic acid is very much greater from those in which muscular contractions have been induced, than from those which have been suffered to remain at rest. Muscles which have contracted repeatedly, give off quantities of carbonic acid, and Bernard discovered that the blood coming from contracted muscles contains no oxygen, but much carbonic acid. It would be erroneous to suppose that this carbonic acid is the primary product of muscular contraction. There are, on the contrary, fixed acids developed by this act.

The mechanical force of contraction is not the only one developed by the chemical changes which have been thus briefly glanced at. Heat is also produced, as is easily made manifest by Melloni's thermo-electric apparatus.

From these considerations it would appear that the con-

traction is not the direct result of the electric shock, but that the current first induces chemical changes, and that these chemical changes bring about the shortening of the fibre. This shortening has been compared to the approximation of the rings of a soft iron spiral, suspended in a helix, when the current passes. This suffices for an illustration, but is too crude for an explanation. The approximation of the muscular discs is more complex than a mere magnetic polarity.

(To be Continued.)

ARTICLE III.

The consequences of Fillings of different Metals coming in Contact. By R. P. Nevill, D.D.S.

In these palmy days of professional progress, when all who desire may read, and learn; when our libraries may be filled with text-books and periodical literature which will compare favorably with that of the medical or any other profession, it is very surprising to see men, who profess to be first class operators, and superior to the majority of dental practitioners, (in their own conceit;) men who hold enviable positions in the confidence of the public, performing operations wholly contrary to the most simple teachings of common sense.

Some months ago I was requested to visit a lady at her residence for the purpose of extracting a tooth. She had been confined to her room for some time, and complained of pain in the right side of her face, somewhat similar to neuralgia. She said it was not exactly like tooth-ache, but that it annoyed her day and night, and that she wished the first superior right molar removed, as she referred all the trouble to this tooth. Upon examining the tooth I found it had four fillings in it; two of gold in the grinding surface, one of tin in the posterior approximal, and one of amalgam in the anterior approximal surface all of which seemed to be doing well. She informed me that

the latter cavity had been filled with gold, which came out, and that her dentist had replaced it with amalgam about three weeks previous to the time I was called to see her.

Prior to this time she had experienced no trouble with her teeth, and none of the cavities were very sensitive when the fillings were inserted. The gum was healthy, except that it seemed to be somewhat redder than natural and slightly turgid. I did not feel that it would be proper to remove this tooth, as I saw no reason why it should cause all this trouble. I therefore requested her to have her medical advisor treat her for neuralgia. The next morning she sent for me again, her family physician being present, who stated that he did not think the affection was neuralgia, as it yielded to neither opiates nor quinine, and that he thought the tooth should be extracted immediately. I told him I thought differently, but that I would perform the operation if the patient determined to have the tooth removed.

The physician administered chloroform and the tooth was extracted. I then examined the tooth to ascertain the cause of the trouble, and found that the fangs were healthy. I removed the amalgam filling and discovered that it was in direct contact with the upper portion of one of the gold fillings; none of the cavities approaching very near to the pulp. I concluded that galvanic action brought about by the two fillings of different metals, coming in contact, was the cause of the whole trouble, and that the tooth might have been saved by removing the amalgam filling and replacing it with gold. This case opened my eyes and I determined to be more cautious in future.

Another case, quite similar to the above, the symptoms being almost identical, presented itself some six months later. A lady called at my office to have a tooth extracted, complaining of pain in the first superior left molar and second bicuspid teeth, but could not tell which of these she wished extracted. The molar had a filling in the anterior

approximal surface, and the bicuspid one in the posterior approximal surface, both being very much discolored; she was under the impression that they were both of tin. The space made by separating the teeth had closed up, so that the two fillings were in contact, and the bicuspid was a little loose. The teeth appeared healthy, and the fillings were apparently doing well. No decay was visible around their margins, and I refused to extract the teeth; she then insisted on having the fillings removed, which I also refused to do. Her teeth on that side needed scaling very badly, and in the lower jaw on the same side some were very much decayed. I removed the tartar and extracted the teeth which were too badly decayed to be restored to health. These operations were of no decided benefit, and she returned the next day determined to have one of the teeth referred to extracted.

On examining the fillings with an excavator I found that one was composed of amalgam and the other of tin. I stated to her that the fillings were not both of tin, and after a few moments reflection she remembered that the *dentist* had informed her that the teeth could not be filled with anything but some plastic material. With a file I made a free V shape separation, from which she experienced immediate relief, and before leaving the office informed me that she was entirely free from pain. She has had no trouble with her teeth since, and should this be the means of giving the least ray of light to guide the inexperienced, my object shall have been fully accomplished.

ARTICLE IV.

On the influence of Extreme Cold on Nervous Functions.

Dr. B. W. Richardson, Senior Physician to the Royal Infirmary for diseases of the chest, has been delivering a series of lectures on this subject, and we present to our readers an abstract of the more important portions of his interesting and valuable remarks.

When any portion of the human body is exposed to cold, it is necessary to reduce its temperature to 16° of Fahrenheit's scale, before actual congelation occurs. By exercising great care, this reduction may be carried to 10° or even 8°, but in every case a rise to 16° occurs at the moment of freezing. In such experiments, the phenomena vary, according to the progress of the reduction of the temperature, and rapidity of the recovery.

He exhibited an experiment on his own arm with two ethers of different rates of volatility. With that which evaporated most slowly, the first phenomenon was a sense of coldness, due to the abstraction of heat from the nervous network. This is followed in a short time by redness and a sense of heat. The plasticity of the blood is diminished, the tension derived from the nerves and exerted on the vessels is reduced ; in the part there is increased vascularity, and around the part there is resistance which gives pain. With the ether of rapid evaporation, there is in the part to which it is applied, sudden blanching of the tissue and total insensibility, and in the part surrounding it, redness, exalted sensibility and a slight sensation of burning. In the blanched part the nervous filaments are compressed by the solidification, and the equally compressed capillaries are bloodless. In the reddened part, there is no compression, but the vessels are surcharged with blood, and the sensation is that of a burn or of acute inflammation. On removal of the spray, the white part becomes vascular, it experiences a sensation of heat; and slowly returns to its natural condition.

The duration of these phenomena varies with the subject. In birds, with a higher temperature than that natural to man, the progress of freezing is much slower, while in cold blooded animals, like frogs, the freezing is almost instantaneous. So in men of high, vigorous health, the surface long resists freezing, and in cases of inflammation, like whitlow, it is extremely difficult to congeal the part. In both these cases the reaction is prompt and decided.

In debilitated persons, on the contrary, and especially in the very old, freezing is extremely rapid. The lecturer mentioned one instance in which a gum was frozen in two seconds. Resistance also differs in different parts of the body, and is greatest in those naturally subjected to motion. It is greater in the hands than the arms, in the limbs than in the back.

As for the vascular line surrounding the blanched part, and manifesting increased heat and exalted sensibility, it is in the same condition as the frozen part before congelation, the stage of preaction, as the lecture calls it, or during reaction. At the moment of freezing, the liquid blood of the frozen part is forced out into the surrounding vessels, themselves weakened by the proximity of the cold. Hence arise in these latter vessels, congestion, resistance, friction, and consequently increased developement of heat.

The lecturer tabulates these phenomena as follows:

1st Stage or Starting point.

Natural condition :—
Temperature 96° Fahr.
Sensibility perfect.

2nd Stage, (Preaction.)

Innervation, removal of nerve-force.
Increased vascularity.
Increased temperature.
Exalted sensibility.

3rd Stage.

Quiescence.
No vascularity. No nerve force; no blood.
Temperature 16° Fahr.
Perfect insensibility.
Solidification of water of tissues.

4th Stage, (Reaction.)

Returning vascularity of paralyzed vessels.
Increased vascularity.

Increased temperature.
Exalted sensibility.
Re-solution of water of tissues.
Innervation continued.

5th Stage.

Return to natural state.
Nervation of vessels.
Reduction of vascularity.
Temperature 96° Fahr.
Natural Sensibility.

When the nervous centres are acted upon by the ether spray, different results are, as might be expected, obtained, as one or another centre is frozen.

Thus when the cerebrum is congealed, the excitability of the spinal cord is greatly augmented. The animal lies on its side, breathing heavily like an apoplectic patient, totally devoid of consciousness, and when undisturbed entirely quiescent. The slightest excitement of the surface however, even a current of air blowing on the body, brought on convulsions, unconscious, painless, co-ordinate, showing the continued influence of the cerebellum, and confined to the voluntary muscles, thus establishing the spinal nature of the excitation.

Majendie, it will be remembered, established the fact, that, when the *corpora striata* were removed, there were violent forward movements of the body. He accounted for this phenomenon by supposing that all forward movements originated in the *cerebellum* or *medulla oblongata* while the backward motions were under the control of the *corpora striata*. Of course the suspension of the influence of these latter bodies, allowed the former to perform their peculiar function unchecked.

Deep freezing of the cerebrum, so as to involve these corpora striata, brought about the forward movements. Sometimes they were slight, resembling the nodding forward of a person asleep in a chair, sometimes they were

rapid. When one half of the cerebrum was frozen, irritability of that side of the body was destroyed, while the other side still retained a little.

As far as the cerebrum itself is concerned, the animal is in a sort of artificial hybernation from which it may recover. On recovering, the brain appears to have experienced no injury; the phenomena being simply those of awakening from a profound sleep.

When the cerebellum is frozen, in a pigeon, some stupor occurs, followed by flapping of the wings and backward movements, occurring in distinct paroxysms. In rabbits there are stupor and convulsions, but no backward movements, perhaps because the cerebellum in them is not so easily isolated, and the action of the cold may extend to the corpora striata. These movements depend upon the suspension of the action of the cerebellum which regulates the forward movements, leaving the corpora striata unimpeded in their action on the backward motions. It is really, therefore, the action of the great anterior cerebral ganglia which we see in these cases.

A corroboration of this is to be found in the fact, that, during the stage of preaction, or excitement preceding actual congelation of the cerebellum, forward movements are observed, as they also are during the stage of reaction. The excitability of the cerebellum, under these circumstances, is greater than that of the corpora striata, and therefore, it manifests its own peculiar activity.

When the medulla oblongata is frozen the phenomena are those of disturbed respiration and symptoms of apnœa. The author has never seen a pigeon recover after freezing the medalla oblongata, though Mitchel has. In rabbits, when the cerebellum is subjected to cold, there is first a period of excitement in which the muscles of respiration share. The breathing is first rapid, then the respiratory muscles are contracted, then paralyzed, and the creature dies. Sometime death occurs instantaneously as when the cerebrum and cerebellum are first frozen; a

single jet of spray on the medella oblongata will then kill.

The condition of the lungs varies according to circumstances. If the freezing has been gradual they are intensely congested; if rapid, they are collapsed, bloodless and perfectly white.

When the spinal cord is frozen in frogs, stupor and paralysis occur, which gradually disappear upon recovery. In birds, backward movements and stupor occur when the cervical region is frozen. Below the fourteenth vertebra, however, counting from the head, only weakness or tetanic rigidity of the limbs occurs.

When a nerve-cord is frozen gradually, the first phenomnon is overaction, causing sensation at the distal extremity but there is no convulsion. When freezing is complete, sensation is entirely abolished. and the nerve may be cut through, without exciting pain. The frozen nerve is at first slightly coloured, then suddenly becomes intensely white and very hard. Upon thawing, the nerve gradually resumes its natural appearance, without much reaction.

The condition of the nerve materially affects its power to conduct electricity. In the fresh state, as is well known, it is quite a good conductor. When dried, it loses this power completely. When frozen, however, it still conducts electricity, although it cannot convey sensation. If, however, the freezing be continued till the whole calibre of the cord is reduced to a mass of ice, the nerve no longer conducts electricity. In a living animal this gradual change is well-marked. At first the electric current passes freely, decidedly deflects the galvanometer, and produces writhing of the muscles. As the cold increases, the deflection of the needle of the galvanometer diminishes, and so does the twitching of the muscles. At last, when the freezing is complete, the needle is no longer deflected and the muscles cease to twitch. After a time, if the action of the cold be suspended, the parts retnrn to their natural conditions.

One remarkable phenomenon, Dr. Richardson has ob-

served. If the nerve cord be frozen above the part through which the electric current is made to pass, that is to say, nearer to the brain, the motions of the muscles are suppressed, just as if the frozen part itself had formed part of the circuit, and they are restored again upon the return of the congealed portion to its ordinary temperature.

So far we have spoken of the action of cold on compound nerves. In nerves of motion, there is first violent action of the muscles to which they are distributed, then sudden cessation of motion and rigidity until natural temperature is restored.

(To be Continued.)

ARTICLE V.

Dentistry as a Fine Art. No. 4.

By Norman W. Kingsley, Professor of Dental Art and Mechanism, in the New York College of Dentistry.

In our last article we presented a type of natural teeth, offering it as a standard for comparison.

It is not to be expected that the artist, be he manufacturer or dentist will conform to it strictly to any great extent. The instances in which one peculiar form is the very best that could be selected as adapted to all the requirements of the case, are few, compared with the whole number. In the type presented we find a beauty of form that is rarely seen except in youth.

The undulation of the cutting edges of the incisor, in the friction of antagonism, soon give way, to a line more nearly square with the sides of the tooth.

Any one of but limited observation has noticed, in many cases, the serrated edges of the incisors, both superior and inferior, immediately after eruption, and also that in a little time this peculiarity has passed away.

This wearing away of the antagonizing ends of the teeth

is the most natural modification of the perfect form of the tooth, and is common to them all.

A great variety of forms can be made, all harmonizing with what we see in nature by taking a well developed type, and producing the appearances above indicated.

Thus, by cutting off the ends of the teeth as exhibited in the illustration, we give the semblance of age, and that without in the least changing the form of the upper portion.

By having the mind clearly impressed with an ideal standard, appropriate selections from a ready-made stock will be more easily made; or when the desired form is not supplied, changes may be secured to a limited extent by grinding. One thing is to be especially avoided; mannerism. The adoption in all cases of any type, or its variations, however excellent, can only end in deformity.

Too many artists are mere mannerists, either by carrying some single idea of their own into all their works, or what is more common, copying the modes and peculiarities of genius, and thus caricaturing, rather than imitating nature. Mannerism is always an evidence of weakness.

For a complete knowledge of probable and possible variations, the student must be a close observer of nature. His standard of beauty will finally be the result of the rejection of nature's defects, and the combination of her excellence. Imitate nature, rather than attempt to copy her. A copy of any one presentation would not probably convey as pleasing an impression as an adaptation of an imitation by an artist who had throughly studied the requirements of the case.

That method of making artificial teeth which requires, for success, the possession of the highest order of artistic talent, is undoubtedly carving.

In these cases the artist cannot to any extent copy nature; he is compelled to imitate her, and upon that art which conconceals art his success depends. Not only must he carve each individual member with a character which shall harmonize with the external features, but the arrangement or

("grouping," as an artist would term it,) must be the result of most careful study. There is another style of work which requires a lower order of talent, but in which the results are in many cases quite equal to the best efforts at carving. Continuous Gum work, known as the invention of Dr. John Allen, is the result of the arrangement of single teeth in any desired form, and the completion of the operation by forming around them an artificial gum.

No doubt, if the teeth in the market were in form, color and variety, all that is needed to meet the requirements, this method of forming an artificial denture would be all that art demands. It would then possess all the merit of carved work, and in some respects afford even greater opportunity for artistic display; being also much easier of accomplishment. As it is, the same taste and study are required in grouping, as in carved blocks.

Absolute rules cannot be given for this art. Suggestions only can be made which may prove a valuable aid. It must be borne in mind that we are not dealing with the natural organs, and some allowances and deviations must be made for that almost imperceptible difference in appearance that exists in the artificial ones even when they are the most perfect of their class.

Well-formed natural teeth please the eye when symmetrically placed even close together in the arch.

Artificial teeth under like arrangement nearly always betray their origin.

In this connection we may gather much profit from the directions given to the painter. The general instructions are pertinent and applicable.

"Nothing is so injurious to effect as a crowded picture. If the subject requires the introduction of many figures they should be distributed in masses, or groups, in different gradations. The object in breaking a composition into groups is that the eye in passing from one to another, may, by having a distinct classification of the parts, easily comprehend the whole. Figures should be more or less varied

in attitude, because an exact repetition of line produces formality. The manner and extent of variation must be decided by the subject. They must also vary in regard to prominence. The artist who represents all the figures introduced in his picture as holding the same rank, making each one equally prominent, understands nothing of the principles of nature, or the laws of art. The same artist will, with great labor, bring forward on his canvas, the most insignificant objects; for trivial minds ever value trivial things."

"Nature never repeats herself, even in two sides of a leaf."

"Such precision belongs to machine work; and, in studying nature we learn that variety is no less necessary to a pleasing composition than unity. To the grace and beauty of the whole work, harmony is indispensible. Without harmony each part may fail of the effect intended, however true in design. There must be harmony of line, harmony of grouping, harmony of light and shade, harmony of coloring, harmony of expression; each part must be so adapted as to correspond to the rest. The attitude must be in keeping with the expression; the color, with the subject treated; and the accessories must be true, both to the character and the age represented: a harmonious whole is always more or less pleasing in itself, independent of subject or style."

"Unity is distinct from harmony, and requires one point of view, one focus of light, one tone of color. There may be unity of parts when harmony in the whole is entirely wanting. In learning the rules for composition, as in all other departments of art, the artist must study nature to find his fundamental principle."

"We find every degree of strength and beauty, every variety of element and every possible variety of combination in the human form and character, and according to the law of harmony that pervades life, we also find,

that the intermediate combination, that serves to unite and harmonize the two extremes, partaking alike of the character of both, is never wanting."

The application of these principles for a number of years in the arrangement of artificial teeth, has satisfied the writer that in no other way can so pleasing effects be produced.

The gratification of the eye by a judicious deviation from uniformity is nowhere more strikingly illustrated than in landscape gardening. The traveler who is familiar with the ancient parks or gardens of the continent of Europe, laid out with all the regularity of squares on a chess board ; the trees and shrubbery often trimmed or twisted into fantastic shapes unlike the free growth of nature—experiences a sense of great relief, in visiting the parks of England where the art in the arrangement is less mechanical and more concealed.

This formality and stiffness is not displeasing at first, to the uncultivated, but the eye soon wearies of it and seeks relief in variety. It is this action of the mind we must consult in the arrangement of artificial teeth ; and in doing so, it does not follow that the mind will be able to recognize the cause of that which gratifies it. The æsthetic sense may be fully satisfied without being aware of the true reasons of the satisfaction.

We have shown in a former article the undulations of line manifest in every view of each tooth. To harmonize with this character, the arrangement of the whole must avoid straight lines. The teeth ought to be so placed that their cutting or grinding ends will not all be upon the same level.

Borrowing again from the art of drawing in perspective ; we must first establish the horizon line ; and our deviations will be made from that. Thus, a very natural order is, to bring the cutting edges of the incisors down to the horizon line ; let the lateral incisor stop short, and carry the point of the canine below the line. Let the bi-

cuspids touch the line, place the first molar above it, the second molar higher still ; and the third molar higher than either.

Any material deviation from such an arrangement will nearly always incline to deformity.

For the position in the arch, an almost indefinite variety is admissable ; comprehending their rotation on their axes, the spaces which separate them and deviations from a uniform curve. Artificial teeth will always look better if placed so that the form of each is clearly relieved against the shadow of the spaces between them.

A compact row in an aged person where there are many external evidences that nature is giving way, strikes almost any one as an incongruity. With age we see a shifting of position of the natural teeth which is in perfect harmony with the wasting of muscle and tissue which characterizes advanced life.

For the best artistic effect, the spaces between the teeth should not be uniform in width, but there may be comparative uniformity in the two sides of the mouth.

In general the central incisors will look better if nearly or quite in contact, but may be relieved by a space between them and the laterals. The canine may, or may not, be separated from the lateral by a decided space, but a considerable vacancy may be left between the canine and bicuspid without any detriment to beauty.

In addition to the variety that may be caused by a judicious distribution of spaces, a most wonderful effect upon the expression will be caused by the partial rotation of a tooth, or by giving prominence to one or more in the arch.

For natural expression, the central incisors and canines must occupy a fixed and unalterable location.

The centrals control the *profile* of the mouth, while the canines support and give character to its *corner* ; the two most important points in the whole arrangement.

There can be but little or no deviation admissable in the

location of these teeth, but a partial twisting or a different inclination may often be resorted to with good effect.

The central incisors will however generally appear better by having them stand with their flat faces on a line with each other, but the canines may be rotated slightly, in either the same or opposite directions without disfigurement.

The lateral incisors and bicuspids should occupy positions subordinate to the canines and centrals. Considerable latitude may be shown in placing the lateral. It may have a greater inclination toward the median line than the others, or it may be twisted more on its axis; the anterior corner of the cutting edge may be thrown forward of the central, or the whole tooth may stand within the arch, either method carried to a limited extent will add to the naturalness of the effect.

The bicuspids should stand within a curved line formed by the centrals, canines, and molars, partially hidden by the prominence of the canine.

The foregoing remarks apply entirely to the construction of an upper denture, but are of greater force when an entire upper and lower denture are to be supplied.

The character decided upon for the upper, will govern the character to be given to the lower set.

Where any great number of the natural teeth remain upon the lower jaw and an entire upper set is to be supplied, the character of the lower teeth will influence the form and arrangement of the artificial ones and thus the suggestions before made will be modified to meet the case.

Perfect harmony would therefore require that noticeable defects or irregularities in the lower natural teeth should be imitated in a modified form, in the construction of the upper.

Thus, marked irregularities of position, below, will indicate an irregular arrangement above, but not necessarily to the same extent.

Permanent discolorations on the surface of the natural teeth would also indicate a modified imitation of the same on the artificial.*

It is the comparative perfection of artificial teeth, together with their stiffness and formality, which, even if the color be appropriate, betrays them in persons of full age.

Tricks or devices may be justifiably resorted to in such cases. The grinding of the cutting edges to produce the appearance of a natural tooth broken or bruised by abrasion, is such a device, and may be adopted occasionally with much benefit. Not that there is any intrinsic beauty in a broken tooth; nor that there is any charm in its contrast with a perfect one, but the eye is so accustomed to see these slight defects in the natural teeth, that it comes to regard them as only allied to nature.

The insertion of gold fillings in exposed portions of the teeth is another trick which can sometimes be made available with propriety. In the construction of a partial set where there are fillings in the natural teeth which are exposed to the ordinary observer; harmony demands that there be no large number of artificial teeth inserted, perfect in their form and appearance. It is then eminently proper to adopt this device, but the filling should not be conspicuous or obtrusive. In making an entire set this trick has very little to recommend it. The means at our command in such cases are sufficient to enable us to conceal our art without resorting to the questionable device of suggesting to the mind, decay, and thus induce the inference

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* In 1852 I was called upon to insert an upper set of teeth where the natural lower teeth were sound, but stained by long neglect, in marked and irregular spots over the surface.

After finding myself unable to remove the discolorations, I resolved to imitate them, and carved a set of teeth and stained them in the baking with a preparation of *terra di sienne*. After they had been worn a year they were exhibited in the mouth of the patient to the Jurors at the "World's Fair" in New York in 1853, and elicited their highest commendation. Vide Jurors' report.

that the organs are natural. In the case of the partial set, harmony with the exposed natural teeth demands it, but in an entire set it is of doubtful propriety.

But few words can be added to the remarks in a former article on color. The canine teeth in nature are less translucent and more deeply shaded, than the incisiors or bicuspids. This should certainly be imitated so far as the canines are concerned, but in the opinion of the writer, we shall produce a better effect with artificial teeth by *not* inserting bicuspids of a lighter shade than the canines.

The artificial tooth does not absorb the light as does the natural one, and when placed in shadow as the bicuspids *in situ*, they are rendered more conspicuous. Where natural teeth of divers colors are scattered, and the vacancies are to be supplied, it is our duty to harmonize in color each artificial tooth with its natural neighbor.*

It will be manifest that it is simply impossible to carry all the foregoing suggestions into practice with some of the methods of constructing sets of teeth now in use.

With gum teeth for plate work there is but little latitude for artistic effect consistent with the mechanical execution; with blocks made for rubber there is still less freedom of arrangement for the operator.

Single teeth without gums are the only ones as a general rule, that will permit us to exercise our taste unlimitedly.

In entire sets where the absorption of the alveolar process necessitates a substitute to restore the contour, we find

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* I was required on one occasion to insert the four superior incisors. One of the canines was of exceedingly fair color, the other was very much discolored by a black amalgam filling on its anterior approximal surface, which the patient on no account would have disturbed.

A block was made in which the side of the lateral incisor next the discolored canine was deeply stained with platina, and a most excellent imitation in color was produced, and the other teeth were vari-colored, grading in shade from one canine to the other. The effect was very good; destroying the conspicuousness which the discolored canine would have shown in contact with an unstained associate.

ourselves limited to two methods, viz. the English method of forming the gum of vulcanite the same as the base, and a platina plate with a continuous porcelain gum; the continuous gum, as has been before remarked, presenting advantages in an artistic point of view, which are thus far unequalled.

Some effort has been made by the manufacturers to furnish an imitation of the continuous porcelain gum in a form adapted to a plastic base, and considering all the mechanical difficulties to be overcome, their efforts have resulted in considerable success.

Far more artistic talent as well as mechanical skill is required in making from a mould, a block of several teeth joined by a gum, than in the production of single teeth. The suggestions heretofore made as to their arrangement, applying here with the same force to the manufacturer as to the dentist in his adaptations to a special case. Many of the sections made for vulcanite, show conclusively that the artist who modeled them, could never have studied nature very long, nor very closely.

There is often displayed far more of the artist's invention, than his imitation. Many of the little details which go far to influence the appearance of the whole, are often neglected.

For instance, the teeth will often be fused together with particles of the tooth body left between them before baking, or what is equally common to find the beauty of the tooth in its form, ruined by a V shaped separation between them, terminating in contact with the gum, half way up the tooth; or, again to find the central and lateral with such a space on one side and the corresponding space filled up. The point of gum between the teeth is often pale and indistinct. In these blocks the individuality of the tooth should be especially clear; brought out by a clean and well defined space and the color of the gum between, in sharp contrast, or the *tout ensemble* will betray the porcelain character of the material used.

The writer was shown within the past year, some blocks made by Dr. Eccleston of Oxford, N. Y., which possessed much merit. They were evidently in their form and arrangement a copy rather than an imitation of nature, and the misfortune was, that nature in her most pleasing developements had not been chosen. However they evinced earnest inquiry in the right direction. The great difficulty with all sections made in moulds is that the one set form which the mould produces is necessarily of limited adoption.

When we consider the infinite variety of the human countenance, and the equally infinite diversity in form of the jaws, which a dentist sees; (no two being exactly alike,) and then consider that there are thousands with a conformation of jaw peculiar to each, who are wearing artificial teeth of exactly the same size, shape and color, in fact all cast in the same mould, and really belonging to but one individual, we begin to realize the paucity of our resources.

(To be Continued.)

ARTICLE VI.

The Blood: Its Progress and Function.

By Professor Rufus King Browne, M.D.

The Mammalian blood, consists of a very viscous liquor, and two sets of soft-solid bodies—the white and red corpuscles. Of the anatomical character of the former, I have already spoken. I shall now briefly consider the results of observation, upon the different rates of progress through the blood channels, of these two constituents. The current of the blood passes through a set of endless or closed pneumatic tunnels, of fleshy, contractile and resilient substance, filled not quite to repletion, the arteries and their extensions, the capillaries and veins. One of the earliest facts which forces itself upon the notice of the careful and appreciative observer of the circulation is, that there

is the most notable difference in the rate and passage of the liquid of the blood, and its soft, solid constituents—or corpuscles, especially the red ones. The red-corpuscles do not pursue their way through the column of fluid, at the rate of the latter, but with a rapid motion or forward movement within it. The plasma moves at a far slower rate. The so-called "still layer" observed in microscopic examination of the current of the blood, within the capillaries of a living animal, is not at all what the designation describes, but is the slow moving plasma. The red-corpuscles dart through the plasma each in its own track, until they reach the capillary flow, where they move at a still different rate from the there more slowly moving plasma. There has always been with physiologists an ill-defined notion, that the red-globules were "destroyed" in the organism;—a supposition which has existed in the form of the notion that they are disintegrated or broken up in some particular organ of the body. But this supposition, on the other hand, has been but little respected by other physiologists, who have as an alternative, maintained that these were as permanent elements, as any of the anatomical constituents of the body, organized in tissue. The first notion is undoubtedly erroneous, for it is apparent to the least reflection, (which seemingly those who maintain it have never given to the subject) that a destruction or disintegration, bodily into fragments, of these bodies, would constitute a permanent disability of the destroying organs, to dispose of the soft solid debris of such a process. But, this objection does not exist against a gradual and progressive, continued, process of *dissolution*, accomplished not in virtue of the destroying function of any organ, but in virtue of the remittent partial oxidation and *de*oxidation of these bodies, during each transit through the circuit.

During their course, through the plasma, the red blood-globules continually yield to it a part of the oxygen they take up in the pulmonary circuit—while the plasma itself

yields to the tissues, a part of its highly oxidized substance to repair, by molecular action, the substances constituting the waste. Although we just spoke of the highly *oxidized* plasma, yet the form in which this yielding of the oxygen of the globules to it, is performed, is not an *oxidising* one—*not* the formation of a compound with *oxygen*, but one in which the oxygen is in association with the plasma, and this is undoubtedly the state, namely, of association, in which it is yielded to the tissues.

The well known truths of chemistry have long and generally, if not always, been misapplied in the notion that, the impletion of oxygen is a building or repairing process, for it is exactly the converse of this, being a process of preparing *waste* material. It is for this process that the plasma containing oxygen is transuded to the tissues. It is a fact well known, that in the ultimate or cellular portion of the lung tissue, amid which everywhere the capillaries of that structure run, the blood channels hold a far larger proportion of red-globules, than elsewhere. This is not to be accounted for on the supposition, that any *portion of* the plasma has been *retarded*, but only, by recognizing the fact, that the globules have made the round of the circuit, with greater celerity, than the corresponding plasma, which received its impulsion from the left ventricles.

This phenomenon is consequent on the fact, that the blood-tunnels are never filled to repletion, or to the extent of their full capacity, by the volume of plasma, so that as has been often noticed, there occur very wide differences in their comparative fulness, in different parts of the system. In one capillary district, at a given time therefore there may not be more than half, or less, the actual quantity, that there is in another, or others, of precisely equal holding capacity or calibre.

This remarkable difference of quantity in that portion, of the arterial system, which (with its walls) constitutes the heart, is regular and intermittent; but it also exists, at

all times, in various parts of the vascular system, as compared at one moment with another.

The flow of blood through the lungs is not constant but *re*mittent. With each diminution or "collapse" of the size of the lungs, a very remarkable and hitherto entirely unnoticed change takes place, in its vascular or capillary portions. During each enlarged or inspiratory state of the lungs, the blood-hollows, are at their normal capacity and condition for the free passage of the blood; but during expiration, the capillaries return to a state of comparative compression, by contorting upon themselves,—a phenomenon not easy to demonstrate and this unfortunately it seems as yet not practicable to obtain, for the *action* of the lung is one which cannot be observed with the microscope.

So far, as I know no observer has yet hinted or even imagined the fact, that the capillary districts of the lungs, must undergo very remarkable mechanical and anatomical *changes* in their adjustment, as an arrangement of structure, in the periods of the acts of *in*spiration and *ex*piration.

The lungs are continually passing, without intermission, into either one of two widely and unlike anatomical characters as organs: *from* one of comparatively small size and air-holding calibre, *to* another of comparatively great size or calibre. Between these two perfectly reciprocal characters of form, size or dimensions, there is no state of cessation, rest, or stasis, but an undivided continuity of movement, to the least, or the greatest of their dimensions. Between the end of *in*spiration and beginning of *ex*piration there is no cessation. They are in a constantly dynamic condition as compared with a *static* one.

This change in their dimension, size, contour and calibre, is a change in the arrangement of all the tissues comprising these structures. The fact needs but once to have been conceived and stated, to secure instant assent,—to be admitted as a fact. But to demonstrate the exact

character, mechanically and anatomically considered, of this change, is the difficulty I have alluded to, as one we are not yet able to overcome. Of the fact, no faintest recognition, has yet been made, for the various designations uniformly in use, intended as descriptive of this constant progress of passing from the greatest to the least size, from one anatomical character and shape to a different one, represent a meaning quite antagonistic. The terms "compression" and "dilation," "collapse" and "expansion," show a notion, entirely at variance with the above truth. A demonstration of the fact by the microscope would demand a complete suspension of *the act* of anatomical change, and this seems impossible.

But in the absence of this inspection, we can readily conceive the extent of this alteration of shape, since it must take place, in every direction, represented by lines, radiating towards both the pleur side and the air-containing or epithelial side, of the entire cones of tissue. It consists of rapidly progressive swelling out *in every direction* of the elements of tissue, passing into an equally rapid progressive return to the minimum size. This movement cannot be at all similar, except in the very gross cubic measure sense, to a change from occupying more, to filling *less* space—to a movement of "distension" as in the case of a membranous sac or vesicle, the uniform wall of which recedes outward, as the entering substance progressively occupies its hollow interior. But on the contrary, it is a movement of the elements of tissues toward the air filled spaces, as well as in other directions.

Now while we are as yet unable, to *see* this act, and thus represent it by an image of the advancing stage, and alteration of the form of the tissues, yet we can, having once mastered the idea, conceive the probable steps, and thus assure ourselves with entire certainty that some equivalent to these steps, *must* occur.

Everywhere throughout the general capillary system,

the calibre of the capillaries, is very much greater than the actual size of the current of fluid they contain, except indeed in local morbid states.

The inner surfaces of their exceedingly attenuate walls are easily brought into contact or apposition, by the slightest pressure upon their outer surfaces. This bringing into contact of the inner surfaces, may easily cause an interruption of longer or shorter duration of the flow of their contents or of a portion thereof. But elsewhere in the capillary system no attenuation of form takes place, such as we are describing as probable in the capillary part of the lung structure. In the progressive extension, elongation or whatever other change of shape takes place, in the progressive enlargement and diminution of the whole tissue of the lungs, the capillaries must undergo the most change.

During the progress of the diminishing and diminished size, the capillaries may be irregularly curved or turned upon themselves. And if this be a correct statement of their course and shape in that state, in the enlarged or swelling stage, they must pass into a changed form, perhaps into a straightened and more direct course. These changes of form cannot occur without involving some effect on the flow of the fluid which occupies their hollows. These effects will vary directly as the anatomical character or shape of the vessels varies; but the minimum and maximum of them, will occur at the moment of transition, when the inspiratory state is being converted into the expiratory, and conversely. Corresponding to this change of anatomical character, the tide of blood, may be *stayed*, to be instantly succeeded by a free pushing or impulsion setting forward at an accelerated rate through the capillaries toward the heart. This followed by continuous accessions in unbroken consecutiveness by these succeeding anatomical changes, are of precisely such a character, as to cause consecutive fulness and depletion, or an approximation to either, the displacement from the plasma of carbonic acid, watery, and animal vapor,—the products of expiration,—on the one

hand, and of the displacement from the air inwardly of the oxygen, on the other, find the proper anatomical conditions.

Brief and imperfect as this outline of the probable facts is, it is yet sufficient to force upon our apprehension, a sense of the great and hitherto wholly unsuspected change in anatomical character, which must with the constancy of the utmost regularity, take place in the consecutive, transition from one state of the lungs to the other. And a full understanding of the case, will undoubtedly afford a complete explanation of the exact physiological events upon which are based the absorption of the oxygen, and the partial removal from the blood of carbonic acid, and of the expiratory waste substance, emitted in the outgoing breath.

It is obvious, that the uniformly accepted estimation of the absorption of oxygen, by the blood, namely, that it passes atom by atom, in a continuous stream, into the blood, through the double partition between the air and the blood, formed by the walls (side to side) of the capillaries and the epithelium of the air cells, is not satisfactory. And of the several classes of agencies in operation to effect its entrance, perhaps none bear so important a part as the change in anatomical characters, I have adduced.

Unremitting attention to the known facts of the case, and constant endeavor to ascertain them in their entirety, have forced upon me a sense of the necessity of investigating the changes of anatomical character which, from moment to moment, the lung tissue is perpetually undergoing, as a condition of understanding the exact nature of the functions of respiration.

Whoever reflects upon this subject cannot fail to find himself concurring with my convictions. It is no valid form of dissent therefrom, to cite the want of actual demonstration. If the view I present fails, as a demonstration, it is to be admitted that it only fails as a *visual* demonstration, and not in a sufficiency of facts. The vis-

ual demonstration, it is apparent, is in itself seemingly hardly within the limits of possibility, but it may yet confirm the view I present.

CORRESPONDENCE.

Letter from Paris.

PARIS, *July* 10th, 1867.

MESSRS. EDITORS:—

I have been so occupied since my return, that I have had little leisure to make observations upon new discoveries in medicine, or inventions in surgery. I must therefore be quite brief in what I have to say this month.

I learn that Dr. Velpeau has presented to the Academy of Science a curious paper by Dr. Rainbert on a new method of introducing medicines into the aninal economy; viz. by the nostrils. He has experimented with morphia, which, he claims, introduced in that way, will cure the most violent headache. I shall endeavor, by the time I send off my next letter, to ascertain some definite facts in connection with the new method, and if interesting or useful, will give you some detail of them.

At present I shall confine myself to some observations on the effect of chlorate of potash upon the gums and mouth of patients, suffering from suppuration, and salivation consequent upon the ingestion of mercury.

In 1856 Dr. Ricord, and subsequently Dr. Fournier, his pupil, published some observations on a new property, which they had discovered in the chlorate of potash, viz. that of neutralizing the effects of mercury on the animal economy. The *Abeille medicale* now gives an account of certain observations made by Dr. Laborde on the subject, at the Hospital de la Charitè.

It is well known that when mercury is taken in strong doses, or without interruption for a certain number of days, it produces salivation, and sometimes inflammation

of the stomach. But if at the same time chlorate of potash be administered under the form of a potion, and in some cases also by friction, these effects will be prevented, or, if they already exist, cured in a few days. Dr Laborde's experiments form two series. In the first, inflammation of the stomach, and salivation having been produced by the use of mercury, the latter was suspended, and chlorate of potash, at the rate of four or five grammes* per day dissolved in water, and sweetened with julep was administered, when the cure was effected in the course of a few days.

In the second series of experiments, the use of mercury was *not* suspended, but the chlorate of potash administered at the same time, and with the same success.

If the chlorate was suspended, the mercury symptoms would return immediately, to disappear again as soon as chlorate was administered. If the proto-iodide of mercury for example, be administered conjointly with the chlorate of potash, it may be continued for the space of two months, in doses of from 15 to 20 centigrammes per diem, without producing any effect whatever on the gums; but no sooner is the chlorate suspended than the mecurial symptoms appear. Except in cases of great intensity, the cure of the latter is effected in about four days.

Dr. Laborde also confirms Dr. Ricord's statement, that the administration of chlorate of potash does not, in the slightest degree diminish the curative properties of mercury.

J. D'Oyley-Evans, D.D.S.

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* A grammes is 15.43 grains

ANSWERS TO QUERISTS.—*Properties, Generation and Administration of Nitrous Oxide Gas.*

Query 1st.—Properties of Nitrous Oxide Gas? *Answer.* This gas is evolved by heat from the salt Nitrate of Ammonia, at a temperature of about 400° Fahr.

The salt first melts and then boils away, being dissolved entirely into vapor of water and into a permanent gas which can be collected over water in a gasometer. Nitrous oxide gas may also be obtained by dissolving zinc in dilute nitric acid. It is colorless, of a sweetish taste and a pleasant smell; its symbol being N O. and its specific gravity 1.527, and "every two volumes of the gas contain two volumes of nitrogen and one volume of oxygen, the whole being condensed or contracted one-third; a constitution resembling that of vapor of water." Eighty grains of nitrate of ammonia, will yield forty four grains of nitrous oxide, and thirty-six grains of water; cold water absorbs about its own volume of this gas. This fact explains the loss of gas, when the water in the gasometer is fresh; by using tepid water less gas is wasted. Sir Humphrey Davy in 1799 first discovered its anæsthetic property upon inhalation, and was also the first to apply it to dental purposes, as is shown in the following paragraph, which appears in the edition of his works edited by his brother Dr. John Davy, London, 1839. The third volume of this edition is entirely devoted to his *Researches on Nitrous Oxyde.*

Page 276. "In cutting one of the unlucky teeth called dentes sapientiæ, I experienced extensive inflammation of the gum, accompanied with *great pain*, which equally destroyed the power of repose and of consistent action." "On the day when the inflammation was most troublesome, I breathed three large doses of nitrous oxide. The pain always diminishes after the first four or five inspirations; the thrilling came on as usual," (in previous experiments,) "and uneasiness was for a few minutes swallowed up in pleasure."

Page 273. "Whenever its operation was continued to its highest extent, the pleasurable thrilling at its height about the middle of the experiment gradually diminishes; *the sense of pressure on the muscles was lost; impressions ceased to be perceived and voluntary power was altogether destroyed.*" Dr. Horace Wells of Connecticut was the first to apply it for the extraction of teeth; this was in 1844.

If nitrous oxide gas is inhaled for about thirty seconds and then taken away from the patient, violent muscular action attended with earnest declamation will, in the majority of cases, follow the removal of the inhaler, and these effects continue for about one minute, when the patient returns suddenly to his mental and physical equanimity.

When, however, this gas is inhaled for one and a half to two minutes, complete repose attended with perfect anæsthesia ensues. It is easy to administer the gas until complete anæsthesia is produced, for after the first three or four inspirations the patient eagerly desires more and the desire seems sympathetically continued even after the anæsthesia has resulted. The anæsthesia generally continues about 1½ to 2 minutes, and its influence upon the system about four or five minutes. The exciting effect is very similar to the operation of ether and chloreform when they, likewise, are administered in small doses, insufficient to produce anæsthesia. It will be seen therefore, that when a moderate quantity of this gas is used it acts as an exhilarant, producing intoxication; and when taken in large doses it induces narcotism and insensibility. By some it is thought to act as a stimulant; by others its action is considered similar to that of chloroform and ether, the retension of carbonic acid gas in the lungs. Fownes speaks of this gas as follows. "The most remarkable feature of this gas is its intoxicative power upon the animal system." "It may be respired, if quite pure, or merely mixed with atmospheric air, for a short time, with-

out danger or inconvenience." "The effect is very transient, and is not followed by depression." Silliman says "It may be breathed without injury, but it should be quite pure and especially free from chlorine and inhaled through a wide tube." "The presence of chloride of ammonium in the nitrate employed should be especially avoided as producing chlorine." The same author also says that "in a few cases, dangerous consequences have followed its use, and it should always be employed with great caution." "In at least one case, in the laboratory of Yale College, it produced a joyous exhilaration of spirits, which continued for months, and permanent restoration of health." "Its effects, however, on different individuals, are various."

In certain conditions it may produce dangerous and even fatal results, but it is generally considered safer than Chloroform or Ether. We regard the indiscriminate use of nitrous oxide gas throughout the country at this time, without fatal results, as strong evidence of its safety as an anæsthetic agent; but at the same time would advise against its use where such disease exist as affections of the heart, active congestions or acute inflammation of the brain, lungs, or kidneys, or in a general plethoric condition, or where there is a tendency to hemorrhagic diathesis. In such cases as these its use as an anæsthetic agent is contraindictated.

(To be Continued.)

The Seventh Annual Session of the American Dental Association.

In accordance with the published announcement, this body assembled in Hopkin's Music Hall, Cincinnati, Ohio, on Tuesday July 30th. The meeting was called to order by Dr. Fitch, the President, and after prayer by the Rev. H. D. Moore, an address of welcome was delivered by Dr. James Taylor, the substance of which is as follows: "*Mr. President and Gentlemen of the American Dental Association.*—The very pleasant duty of welcoming you to the Queen City of the West has been assigned to me. We congregate in the same hall in which the Medical Association so

recently held their deliberations. "It a matter of no surprise to us, and yet of some congratulation that the subject of medical specialities has assumed with this conservative body some importance. It depends very much on the dentist, the oculist and the *speciality* of general operative surgery, what shall be the status and true progress of medical science in the United States. "In looking back over the rapid progress of dental science for the last thirty years, we feel assured that there is no danger of our being absorbed by the mother of us all, but that the great law of nature will hold good here as well as elsewhere, and that youth, with a good germ life, will soon outgrow, or, at least, overtake maturity." "In looking over the curriculum of our Dental Colleges, we are rather disposed to think we shall soon absorb or lay under contribution every department of medical science. We love, venerate and cherish the time honored profession of medicine. It has embraced for ages a vast array of talent. The learned, the great and good, are from year to year adding fresh lustre to her renown. A more noble, self-sacrificing class of men can nowhere be found; and the more we emulate these noble qualities, and the more of her true science we obtain, the higher we shall place the standard of our speciality.

"This Association is an organ of our professional body, whose function is the developement of dental science. Let us nourish it with so rich a diet that the elementary organs shall rear a structure enduring as time, built on the solid foundations of immutable truth. Having this hope and looking to this end, we now, in behalf of the Mississippi Valley Association, the Ohio Dental College Association, the Cincinnati Association, and such other Societies as rejoice in your presence, bid you a hearty and cordial welcome. We would, Mr. President, through you extend the right hand of fellowship to all who rejoice in the prosperity of our profession, and who may visit our city on this occasion." A committee appointed for the purpose reported the following daily order of business. Clinics from 8 to 9 o'clock, A. M. Morning session from 9 to 12½. P. M. Report of Committee on Instruments and Appliances, from 9 to 9½, A. M. Afternoon session, from 2½ to 6 P. M. Evening session from 8 to 10 P. M.

Objection was made to the admission of the delegates from the St. Louis Dental College, and the matter was referred to a committee appointed for the purpose.

Afternoon Session.—After the reading of the minutes, a motion was made to appoint a committee to report upon the relative status of the dental profession with the Goodyear Rubber Company. The President Dr. Fitch, made some remarks deprecating the introduction of this matter into the proceedings of the Association, since the Association as a body, had nothing to do with that company. The resolution was then laid upon the table, but subsequently Dr. Lawrence of Massachusetts, offered the following, which was adopted: *Resolved*, That this Association does hereby reconsider its action at our last meeting, in regard to the Vulcanite Company, and totally ignore the whole subject. Dr. Watt

offered the following: *Resolved*, That members of the Medical Profession of this city, and any who may be sojourning here, be invited to meet with this Association. Amendments were offered and accepted extending the same courtesy to dentists and ministers. Objection was made to this resolution on the ground that no such invitation had been extended by the Medical Convention to the Dentists. The resolution was however adopted. An election was then held, by ballot, which resulted in the choice of the following: President—A. Lawrence. First Vice-President—P. G. C. Hunt. Second Vice-President—A. S. Talbert. Corresponding Secretary—C. R. Butter. Recording Secretary—J. Taft. Treasurer—W. H. Goddard. A committee conducted the President-elect to the chair, who thanked the Association for the honor conferred upon him; expressed his regrets that he could not bring greater executive and other ability to the post than he did, and asked the co-operation of members in maintaining order and the prompt transaction of business.

Dr. Fitch, the retiring President then read an address, briefly reviewing the transactions of the Association during his administration, after which he discussed the nature of *nerve force*, especially in its abnormal state, affecting the practice of dentistry. He enjoined upon his hearers the importance of establishing and maintaining entire compatibility of feeling between them and their patients, in order to success and happy usefulness. An invitation was received from the dentists of Cincinnati and vicinity, to an entertainment on Friday evening August 2nd. Dr. Atkinson remarked that if the entertainment had not already been contracted for and would have been paid for, he would be in favor of rejecting the invitation. The invitation was accepted.

Evening Session.—Dr. L. D. Shepherd of Mass. from the Committee on publication of the Transactions of the Association, reported that the volume was nearly completed and would make a fine octavo book of 450 pages. Dr. Shepherd also presented the report of the Treasurer, Dr. W. W. Sheffield, which showed that the receipts and expenditures amounted to $1038.27. Dr. Lawrence read a report on Dental Chemistry, urging upon Dentists the importance of such a knowledge of Chemistry as would enable them to teach their patients what to eat, when and how, so as to preserve their teeth. He insisted that "we sift from our cereals the best portions of the grain and eat the worst."

Wednesday's Proceedings.

Morning Session.—On motion a committee was appointed to estimate the financial necessities required by the Association at the present session, which committee reported the liabilities to be $460. A motion was made to increase the annual fees of members to $5, which was at first laid upon the table, but was subsequently adopted, and an additional assessment of $2 made upon each member. A committee was also appointed to report on the action necessary to be taken for the publication of the transactions of the Association; also a committee on Dental Therapeutics. On

motion of Dr. Taft, certain amendments to the Constitution, proposed last year, were taken up, one of which was a Code of Ethics, which was discussed at some length, the main question being whether the Association had the right, and whether it was advisable to require local societies to accept and observe such a Code of Ethics. The matter after much discussion, which occupied the greater part of the morning session, was finally laid upon the table.

Afternoon Session.—The Association met in Mozart Hall, at 2½ o'clock, having vacated Hopkin's Hall on account of the noise in the street interfering with the business. The committee appointed to consider what disposition should be made of the transactions of this session reported that the publishers of several of the Dental Journals had generously offered to publish all the discussions and written papers presented to the Association free of charge in their respective journals and they recommended that their offer be accepted. This offer was, however not accepted, when Dr. Taft offered to publish the transactions in a separate volume, and look to the sale of the same for his compensation; this also was refused, and on motion of Dr. Spalding the report was laid on the table with the understanding that the Association would publish the transactions as heretofore, at their own expense, in a separate volume. Dr. Kennecott from the Committee on Credentials, reported that they had had the subject of receiving the delegates from the St. Louis Dental College under consideration, and submitted the following: That the St. Louis Dental College has no existence except under a technicality of a loose and dangerous statute of the State of Missouri; that it has never attempted to fulfil the spirit of this bad law by instituting lectures, clinics or any other mode of dental science; that the degrees or diplomas of this so-called College are null and void in law, and ought to be ignored and repudiated by all regularly constituted colleges and associations; that the scheme of its birth was conceived with very discreditable motives, and its culminating act, the sending of delegates to this Association, merits our strongest condemnation and rebuke; and your Committee, believe that the recognition of this so-called Dental College by receiving its delegates, would be setting a dangerous precedent that would lower the standard of dental education, and puts quacks and mountebanks in places of trust and honor in the profession. The report was adopted. Dr. Kennicott offered the following, which, after some discussion, was adopted. WHEREAS, It is a cherished object of this Association to elevate the standard of dental education and wipe out from the escutcheon of our noble profession the stains of quackery; therefore *Resolved*, That we will not countenance any act of any Dental College that shortens the road to the honorable title of Doctor of Dental Surgery by lowering the standard of professional excellence.

Dr. Rehwinkel then moved to take from the table the amendment to the constitution, embodying a code of ethics. After some discussion the motion was lost.

The consideration of the report of the Committee on Dental Chemistry was then announced as the order of the day. At the close of the discussion on Dental Chemistry, Dr. Atkinson made a report on Dental Pathology and surgery, which was peculiar in its character, Dr. A. contending that the presence of periosteum was not necessary for the reproduction of bone. Considerable discussion followed the reading of Dr. Atkinson's report.

Evening Session.—The discussion on dental pathology and surgery was resumed, during which cases were mentioned where teeth had been replaced that had been knocked out by violence, to establish the theory that the vital connection between the teeth and the organism of the socket might be restored. This subject occupied the remainder of the evening session.

Thursday's Proceedings.

Morning Session.—After the reading of the minutes Dr. Taft read a report from the Committee on suggestions to Dentists, which was approved. The report relates to office students and is embodied in the following form, designed to be sent to Dentists:

The undersigned, the committee appointed according to the provisions of the above resolutions, are fully persuaded that the time has now arrived when every dental practitioner in the country can and should lend his aid in elevating the status of the profession, to the end, that those who are soon to fill our places may be prepared, in a greater degree, to fulfill the reasonable expectations of the public, and hold dentistry in its proper rank among the learned professions.

Our Dental Colleges have done much, and will doubtless do more, but there is a work for the private instructor to accomplish, that students may be better qualified to enter such collegiate institutions, and graduate with credit to themselves and honor to the profession. It is not only essential that Dental Colleges exist, but they should be furnished with properly qualified pupils to insure that success and usefulness contemplated in their foundation.

Relying, then, upon the generous co-operation of our professional brethren, we respectfully submit the following "suggestions" as a basis in "accepting dental students:"

1st. He must possess a good moral character and at least a good English Education.

2d, He must be required to apply himself diligently for three years, including two full courses of lectures in some Dental College, to the following studies, viz:

First Year—Anatomy, Histology and Physiology,

Second Year—Pathology, Chemistry, Metallurgy and Mechanical Dentistry.

Third Year—Operative Dentistry, Special Pathology, Dental Medicine and Microscopy.

We further suggest that the instructor examine his pupil in his studies

at least twice every week, and as much oftener as may be convenient—not, however, including his lecture terms—and should the students, after sufficient trial, fail to exhibit the necessary talent for our specialty, he should be kindly apprised of the fact, and advised to seek other fields of usefulness.

Practitioners favoring the foregoing are respectfully requested to date and sign the accompanying paper and forward to the Committee. A. Lawrence, Lowell, Mass.; C. P. Fitch, New York City; J. Taft, Cincinnati, Ohio.

The question where the next place of meeting should be held was taken up, and on the second ballot Niagara Falls was declared the choice of the Association. Dr. Allen of New York then read a paper on the Physical History of various nations of the Earth, with special reference to their teeth. This report was very interesting and instructive, embracing a cursory review of the character and condition of the teeth of various nations. The points Dr. Allen endeavoring to demonstrate were: 1st, That the teeth of the people of this country are worse than those of other nations of the world; and, 2nd, To show the cause of such bad teeth in America.

Some nations keep their teeth till old age, and lose them as rarely as they do their arms or limbs. In this country, twenty millions of teeth are lost annually from decay. In examining the cause of this loss, it may be stated that the inhabitants of Europe who discard the mineral elements of food, seldom loose their teeth by decay. The Albanians live on milk, cheese, eggs, and boiled maize. Their teeth are fine, and remain good to old age.

The mountain tribes of Asia, especialy the Tartars, have strong, white teeth. The teeth of the Arabs are white and regular. They eat seldom, and never of animal food.

Dr. Allen next mentioned the inhabitants of the East Indian Islands, Zealanders, &c., as having good teeth, which lasted to old age

The American Indians, as a general thing, had good teeth, which are large, never decayed, although worn, as in old age, by use.

The Chilians, Californians, and inhabitants near the bay, all have fine, well set teeth. Their diet is farinaceous. The inhabitants of Peru and Patagonia have beautiful teeth, even in old age.

With regard to the bad teeth of the Americans, it would be said by the candid dentist that they were set in narrow, contracted jaws, and were badly decayed.

Humboldt said of the Camas, that they had fine teeth, like all people who lead a simple life. No nation that changed their food from the condition in which nature furnished it, had good teeth.

Plenty of exercise and fresh air was another cause of the good teeth in the swarthy races.

We have attempted to improve our bread by bolting the flour, but thereby destroyed the mineral elements which go to form the teeth. There are 13.868 mills in the United States: 27,000 men are required to work them, and it requires nearly $9,000,000 annually to change the con-

stituents of our food, and the result undoubtedly is one of the most prominent causes of the destruction of Americans' teeth. Lime is to be found in the outer portion of the grain: and it is needed for the teeth, yet we reject it. It is for the profession of dentistry to do good by diffusing such knowledge as comes to it through experience and research to prevent the evil of premature decay and loss of the teeth.

On motion, Dr. Allen's paper was referred to the Committee on Publication.

The subject of gold fillings was then introduced by Dr. J. F. Flagg of the Philadelphia College who spoke in the highest terms of Morgan's "Plastic gold," Dr. Flagg claimed for this material that a like amount of skill can produce an equal result with much greater ease than with foil; that it contains nothing injurious to tooth substance; that it is purer than gold foil, as has been proved by assays made at the mint; also, that he found in addition to these qualities, excessive ease of manipulation, rapidity of filling, (so much so that a filling may be introduced in a less time than two minutes,) peculiar adaptability to walls of cavity ease of finish requisite solidity, beauty of color, absence of crumbling, thoroughness of compacting, and freedom from waste of material. The assertion made by Dr. Flagg that a filling of this form of gold can be introduced in considerably less time than two minutes met with considerable opposition, many of the members of the Association expressing themselves unfavorably to the theory of the work being properly accomplished in the short space of time—two minutes—as asserted by Dr. Flagg.

Afternoon Session.—Dr. Atkinson moved that the Convention hear Dr. Cutler's paper on microscopy at 4 o'clock.

The report of the Committee on Operative Dentistry was read by Dr. Butler, also a paper under the same head by Dr. Palmer, in which he advocated the use of three wedges for separating teeth.

Dr. Russell of Nashville, made some statements on the theory of filling teeth, interlarding his observations with humorous anecdotes and illustrations. In the course of his remarks he stated that those Professors who mostly charged the highest price, generally made the least money, from the fact that they took longer time to do their work effectually. He instanced the case of the celebrated Dr. Badger, who had informed him that the highest amount he had received for a day's work was in New Orleans, when he got $55. The specified time having arrived, Dr. Cutler of Mississippi read a lengthy and scientific essay upon the "microscopy of the nerves of the Dental Pulp." His views he claimed were supported by practical experimental observation. One proposition was that a molar tooth did not contain less than one hundred thousand nerves.

Evening Session.—A sharp discussion ensued upon the paper of Dr. Cutler, on the "microscopy of the nerves of the Dental pulp" carried on mainly by Drs. Atkinson, Cutler, Judd, Wetherby, Spalding, and Chase. Some of these gentlemen accusing Dr. Cutler of supporting a superannuated worn-out theory. Dr. Cutler in reply remarked that he did not

claim there were no errors in his report, but he wished them sifted from the truths, and not as you would sift out the nutriments from a barrel of flour. He said he had specimens to sustain his proposition, that the tubuli of dentine contained nerve matter, and that he had expended at one period alone, three months of earnest days and almost sleepless nights, in his investigations, and yet he might say that even now he had hardly commenced the anatomy of that little nerve. The question whether the tubuli contained nerve matter or fluid, occupied the entire evening session, and the discussion ended without a settlement of matter in dispute.

Friday's Proceedings.

Morning Session.—Considerable time was occupied in the discussion of a motion to pay the Secretary $50 per annum, which was lost. The report of the committee on instruments and appliances was received. Dr. French offered a resolution that the sum of $5.000 be offered as a prize to any chemist, or other experimenter, who shall invent, for the use of the dentist, a perfectly plastic material, that shall be in every respect be equal to gold as a filling for decayed teeth, and shall more nearly approximate the teeth in point of color.

After some discussion this resolution was laid on the table.

Dr. Spalding offered the following which was adopted: *Resolved*, that the Treasurer be instructed to furnish annually, to the chairman of the Publication Committee, a list of all who have paid their annual dues, for his guidance in the distribution of the annual volume of transactions. The subject of Operative Dentistry was then taken up, and on motion, Dr. Barnum illustrated his method of applying the Rubber Dam.

Afternoon Session.—Dr. Bogue offered the following resolution: *Resolved*, that it is the duty of each member of the Standing Committee to make an individual report, so far as such report can be made, and in case of inability to be present at the meeting, to forward it to the Recording Secretary, from whom it can be obtained by the chairman of each committee, respectively, at the time of assembling of this Association. Adopted.

The Nominating Committee then made their report of the Standing Committees for next year, and the Committee on Publication recommended the appointment of a special committee of three, to receive and take care of articles presented for examination and exhibition at the annual meeting, which was adopted, and Drs. L. D. Shepherd, E. A. Bogue, and Walker appointed as said committee.

The greater part of the afternoon was occupied in discussing the report on mechanical dentistry, during which several interesting cases were reported verbally. Dr. Herriott related that he had made out of English rubber, an artificial nose and upper lip for a soldier who had had both, together with his upper teeth and part of the lower ones, carried away by a piece of shell at Mission Ridge. Dr. Herriott presented photographs of the patient before and after the operation, showing a marked improve-

ment in appearance, and stated that the speech was improved fully as much as the face. Drs. Osmond and Osgood presented cases of cleft palate together with descriptions of the apparatus they applied for its remedy. In the evening an entertainment was given to the association in Hopkin's Hall.

Saturday's Proceedings.

The association met at 9 o'clock, A. M., when the Committee on Dental Physiology reported. Dr. H. S. Chase read an interesting paper on this subject, and also one in the "Absorption of Deciduous Teeth." The report on microscopy was received and referred to the Committee on Publication. A committee was appointed to draft resolutions for next year, expressive of the sense of the Association on deceased members. The Committee of Investigation on decay was continued until next year. The business of the Association having been concluded, the President made a few closing remarks, and adjourned the convention, to meet at Niagara Falls on the 30th of July next.

MONTHLY SUMMARY.

Atropine harmless to Rabbits.—Dr. Ogle, Lecturer on Physiology to St. George's Hospital, publishes in the "*Medical Times and Gazette*," a paper on the "Comparative Immunity of Rabbits to the poisonous action of Atropine."

It has been known for many years that rabbits could eat the leaves of belladonna without inconvenience and Runge showed that this was not for want of power to absorb the poisonous principle, since he detected the presence of atropine, the active alkaloid, in the animal's urine. Dr. Ogle took up first the question; can rabbits eat belladonna with impunity? He fed a healthy young rabbit for six days exclusively on this plant, having first proved the activity of the herb by applying crushed leaves to the eye of a kitten and ascertaining that the pupil was dilated by it. The health of the animal was not impaired.

The next question to answer was: Is atropine absorbed by rabbits, and, if so, is it as poisonous to rabbits as it is to man? Men are easily killed by two grains of atropine administered by the mouth, and are seriously injured by from 1-10th to 1-20th of a grain, hypodermically injected. Experimenting on rabbits, it was found that two grains administered by the mouth produced no inconvenience, while so much as five grains injected under the skin gave only slight and temporary uneasiness. The absorb-

tion of the poison was proved by applying some of the rabbit's urine to the eye of a cat, when strong dilatation of the pupil occurred. Dr. Ogle did not push his inquiries to the extent of inquiring what quantity of atropine would kill a rabbit, that having already been determined by Dr. Camus, who found the mininum quantity necessary for that purpose to be about fifteen and a half grains.

It having been suggested that young rabbits might enjoy an immunity not to be found in older animals, experiments were made to determine this question. It was discovered that youth established no such immunity, that on the contrary, the tolerance increased with the age of the rabbit, while the single symptom of dilatation of the pupil was as readily induced in the old as in the young rabbit.

Cyst in the Lower Jaw.—At King's College Hospital, there was a case of tumour in the lower jaw, caused by expansion of its walls. Sir W. Fergusson extracted a tooth and then broke into the cavity, removing the contents which consisted of a small quantity of gelatinous material. He had seen similar cases in which the walls of the antrum expanded in consequence of the formation of such semifluid growths in a bony cyst, growths which had been entirely cured by puncture and evacuation of the contents. In one instance he removed a large portion of the lower jaw, and found between the expanded flexible laminæ of the body of the jaw, a large mass of dentine. In this case he thought the cavity should have been scooped out before removal was attempted.

New Discovery in Comparative Anatomy.—It is known to our readers that a division of mammalia has been established on the history of their dentition. Thus some, the Cetacea and Bruta, never shed their first teeth, while the rest go through the same changes as man. Thus we have Monophyodonts, or animals which have but one set of teeth, and Diphyodonts, or animals which have two sets.

Now Mr. Flower, the conservator of the Museum of the Royal College of Surgeons, tells us that the Marsupial, or pouched animals, such as the opossum and kangaroo, stand intermediate between these two great classes, for in them is traceable the first

step towards a double set of teeth, the representative of the deciduous set being confined to a single tooth, a milk molar, which is succeeded by the anterior premolar on each side in both jaws. None of the other permanent teeth have any predecessors, though perhaps some trace of their follicular stage might be found at a very early period of their development.

This is not unlikely, since it is known that in some instances, for example, in a few Rodentia, the milk teeth are shed *in utero.* This opinion, however, is merely hypothetical; actual observation never having detected any traces of deciduous teeth in Marsupials. It is a little remarkable that the deciduous tooth alone developed in these tribes of animals, is usually the most persistent in typical Diphyodonts and in man, viz: the posterior milk molar replaced by the posterior premolar.

Deodorization of Caoutchouc.—M. Bourne encloses articles of India rubber in a vessel, surrounding them with charcoal dust, and heats them to 60° or 70° C. for several hours. The charcoal after cooling is removed, and the articles are found unchanged in their minutest details, but completely deodorized. India rubber thus prepared communicates no unpleasant taste to food. Either hot water, steam, or the heat of the vulcanizer may be employed to raise the temperature to the proper standard.

We get the above from the foreign correspondence of the *London Chemical News.*

The Human Bite Poisonous.—A singular occurrence has just happened at Arth, in France. A Lieutenant Felchin was some time back bitten in the thumb by a man named Muller, but he thought nothing of the wound and went next day a journey on his private affairs. On reaching the Balse he found his hand and arm began to swell, and a medical man declared that the case was one of poisoning from a human bite. He at once returned home in haste, but he refused to have the arm amputated. The consequence was that the inflammation increased frightfully, and he died some days after in horrible suffering. May not the system have been at fault?

Quinine as a preventive of Malarial disease.—Dr. Joseph Jone has published in the *Nashville Journal of Medicine and Surgery,* a paper on the above subject.

Statistics of British ships on the coast of Africa collected by Dr. Jones very strikingly illustrate the value of this prophylactic treatment. For example, of 145 whites on the Niger expedition, 130 were attacked with fever, and 142 died, and of 525 soldiers garrisoning Sienna Leone, 386 were attacked and 161 died. These are specimens of the statisties of commands in which quinine was not administered.

On the other hand, in the African squadron, cruising off this same coast in 1856, to the officers and men of which quinine was daily administered, out of a total force of 1680 men, only seven deaths from fever occurred.

Dr Jones lays down the following propositions:

"1. Quinine taken during exposure to the exhalations of miasmatic regions will, in most cases ward off fever entirely.

2. If fever attacks those to whom quinine has been regularly administered, its severity and duration will be much less than in those who have not taken the quinine; it therefore not merely wards off disease but renders it less powerful and destructive when present.

3. To be entirely efficient, the quinine must be administered for some time, at least ten days. affer exposure to the causes of fever."

The formula recommended by Dr. Jones is:

Sulphate of Quinine..3 grains
Dilute aromatic Sulphuric acid...........................5 drops
Brandy..Tablespoonful
Water..3 wine glassfulls

Drop the acid on the quinine, then add the brandy and water. Take the whole just after rising in the morning, and again just before going to bed at night.

Local Anaesthesia by cold.—Dr. James Arnott says (*Med. Times and Gaz.*) "nothing can be more easy than to dip a bit of ice into common salt and press it gently on the skin, and yet this is sufficient to freeze it in less than the quarter of a minute. In some cases, indeed, a frigorific mixture cannot be properly applied without a cup or vessel of peculiar shape to contain it, which unquestionably involves more trouble than the projection of ether; but in several situations the part cannot be congealed by ether, and it is necessary to use either a freezing mixture, or

a metallic ball or oval which has been cooled to the requisite degree by immersion in it. When deep, extensive, and long-continued congelation is required, or when it has to be used when inflammation is present, either in operations or in the treatment of disease, congelations by a freezing mixture, which can be combined with pressure and applied to any extent of surface, is the only measure which will fulfill the purpose. Simplicity and facility of application are doubtless valuable properties, but efficiency must not be sacrificed to ease."

"*Sloughing produced by Local Anaesthesia.*—We examined, a few days since, in the Middlesex Hospital, a young woman whose case is of no little importance in reference to the question of local as against general anæsthesia for operations. Mr. Lawson had diagnosticated the existence of an abscess behind the patient's breast, and as the pus was very deep (under the pectoral muscle indeed) the refrigerator was used, paraffine ether being employed. Congelation was rapidly produced, and kept up for a few minutes. The result has been, that a portion of skin, about an inch by three-quarters of an inch, over the upper part of the breast, has sloughed, and its healing will necessarily be attended by an unseemly scar. The patient is a maid-servant; were she unfortunately a lady, the undress of the modern ball-room would be impracticable without revealing such a blemish as might seriously damage her value in the matrimonial market. The case is certainly exceptional; but the circumstance is worth remembering when exposed parts of the body are to be operated upon."—(*Lancet.*)

Marine Silk.—Among the novelties brought out in the great Paris Exhibition is a silk originating in the sea. M. Joly has discovered that the outer envelope of the eggs of the Ray tribe of fishes is made up of very delicate filaments closely interwoven. They are easily drawn out, and possess the colour and finish of woven silk, and can be woven into all ordinary silk tissues. The interior of the egg contains an albumen which can substitute, in the arts, that heretofore derived from hen's eggs.

Making Light of the Dead.—An ingenious correspondent of the *Gazette Medicale de Lyons*, alarmed at the rapid diminution

of the coal supply, proposes to utilize dead human bodies, which are now wasted. He estimates that an average sized corpse will yield 25 cubic metres of illuminating gas, so that any ordinary body would be worth for this purpose eight francs.

A New Parasite.—Dr. JUDEE, of Bizot, describes a new parasite which he recently found principally about the neck, the breast, and the hair of women The parasite in size and aspect resembles a small dark speck the size of a pin's point. With the naked eye little dark lines are seen in its hard body, and in consequence of the smallness of the object, are confused together. Examined with a power of 140, the following elements are noticed:— A head furnished with two antennæ, an abdomen and four pairs of legs, each composed of four articulations, and armed at its extremity by a species of claw. The body and legs are covered with hair. The three dark lines are not superficial, but deep, and depend upon the organs contained in the abomen. It is very lively, moving rapidly about; and it eats its way, leaving behind a little black powder of extreme fineness. Once separated from the body, it quickly dies. Dr. Judee observes that he has found this parasite on individuals who wear false hair; but he does not think it has any necessary connexion with it. It is common, perhaps, in the Arabs during Rhamadan. The treatment practised was antiparasitic. The insect appears to be a tick.—*Lancet.*

French Malleable Horn.—A French scientific journal gives an account of a new process for making malleable horn. The horn, in chips and shavings, is boiled a long time in a caustic lye of strength of twenty-five degrees of the alkalimeter, by which it is entirely melted. The liquid is then reduced by evaporation to a plastic paste, which may be rolled into sheets, drawn into rods, or moulded in any form. This paste is rendered more strong and elastic by mixing it with india-rubber or gutta-percha. The substances are mixed together in a cast-iron vessel, and passed between fluted revolving rollers, the vessel being heated by steam. The inventors state that, by covering the fibres of cocoa or of aloes with this paste, they have obtained belts more solid than those of leather, and stronger than those of india-rubber.

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ORIGINAL COMMUNICATIONS.

ARTICLE I.

Essential Nature of Caries.

(Continued.)

By H. R. Noel, M. D., Professor of Physiology, Baltimore College of Dental Surgery.

In the case of dentine, the calcification begins with the "*cells or bodies*" that are to form the intertubular substance, so-called, and gradually closes in around and forms what are known in the dry tooth, as the walls of the dentinal tubes. But a portion remains uncalcified, and the uncalcified portions are the fibrils or fibrillæ and pass back to be connected with the proper structure of the pulp. Now what are those fibrils or fibrillæ? What are those soft, fleshy bodies or filaments that fill up, what were formerly called the dentinal tubes? They are but modified "elongated cells or bodies," yet uncalcified, but as the tooth advances in age, the calcification slowly progresses and the size of each fibrilla becomes less—while the walls are thickened. What is lost in fibrillæ, is gained in calcified dentine, or walls; and the dentine becomes *denser*. The dimunition in the size of the fibrillæ, and the diminution in the size of the pulp, are alike occasioned by the direct calcification of the elongated cells or bodies. These cells therefore exist, always between the pulp and dentine

formed, and between fibrils and dentine surrounding ; and these fibrils themselves are nothing more than these "elongated cells or bodies" extending from periphery of the dentine to the pulp proper and into the pulp, and remaining uncalcified ; but liable at any time to be calcified, more or less, and thus lose in size, but gain in dentine surrounding. If, while still uncalcified they are fibrillæ, so equally true is it that once calcified, they form true dentine.

Tomes and Beale support this view. Now we wish to be clearly understood here, and shall repeat in substance what we have just asserted, as upon a clear understanding of this portion of our article, hinge the deductions we intend making, as regards the essential nature of caries.

The relation therefore between fibrils, and what are called the *walls of the dentinal tubes*, but which we shall call *the last formed dentine*, is simply one of organic continuity ; the fibrils in the recent or fresh tooth occupy and completely *fill* the tubes, and the walls of these so-called tubes are but calcified portions of the fibrils ; or in other words, the openings and spaces, called *Dentinal Tubes* in dry teeth have really no actual existence in the fresh tooth, but are occupied by a tissue identical in every respect with that which has been calcified to form the dentine ; and the said tissue, though remaining uncalcified, is liable at any time to calcification, and the fibrils may be obliterated or only have their size diminished : in either case dentine is the product resulting. Now if we begin at the pulp and go out to the periphery, we would say that these fibrils branch, divide, anastomose and grow smaller as they approach the periphery ; but this is not true physiologically ; and we should rather say that the fibrillæ begin by very minute filaments at the periphery, and uniting as they ran towards the pulp, terminate by larger ends in the pulp proper.

Mr. Tomes carefully prepared specimens ; and to satisfy himself upon this point, Dr. Beale did also. The former

carefully removed the pulp from a fresh tooth, and found the fibrils broken, torn, &c., showing by their projecting lengths that they had been withdrawn from the dentine. He fractured a fresh tooth, and examined a thin slice of it: here also the microscope showed the torn ends of fibrils projecting from, and extending into the fracture, between the two fragments of dentine; some passed directly across the fracture from one fragment to the other. These fibrils sometimes, though very rarely, extend into the enamel.

The enamel rods or prisms may be compared to cells or fibres, where cellwall or sheath and contents of cell or body of fibre are alike calcified. They are solid, dense, compact bodies, and if they possess any tubes at all, belonging intrinsically to them, the highest powers of the microscope have signally failed to demonstrate the fact.

We would say then that the vital endowments of enamel are nothing, the vital powers of enamel nothing; that enamel has absolutely *no vitality*. When once calcified, we emphatically deny that enamel can possibly be amenable to any laws, regulating the actions performed in vitalized structures; it changes in obedience to physical violence, or chemical action alone; and once fully formed, is forever beyond the dominion of the vital forces. Enamel may be fractured, may be worn away,—may be dissolved by acids, may be stained or discolored by fluids, and the same is equally true of the marble slab of a table.

The "elongated cells" "rods" or "bodies" were once vital, and contained active nuclei and nucleoli, as centres of vitality, points of departure for vital forces, but these have become calcified, have died, and having lost their vitality are no more capable of exhibiting vital phenomena, than grains of sand. The enamel itself, as enamel, is simply a mineral, an inorganic body, so far as its relations to vitality are concerned.

A careful study of this subject has led us to the con-

clusion, that enamel is not a vitalized structure in the true sense of that word, and therefore *absolutely incapable of vital phenomena*. But *caries* often occurs in *enamel primarily*. We wish this point carefully remembered.

Now as regards dentine, the fibrils redeem it from the class in which we place enamel, for the fibrils have nuclei and the nuclei are centres of vital power, of formations and transformations; and of chemico-vital changes, &c., moreover nutritious fluids do pass by osmosis along these fibres, even to their ultimate branchings and ramifications on the periphery of the dentine. Sensation is conveyed by these same fibrils, even from the very periphery of the dentine to the nerves of the pulp. This will however be more fully developed in its proper place, and we will endeavor to assign to dentine its full share of vitality, and then measure the influence of this vitality in the process we term caries.

In the present state of physiological knowledge are we justified in stating that any structures, tissues, &c., are truly vitalized unless they possess live, active working nuclei? If nuclei are the germs, are the centres of vital power, the centres of the forming and transforming forces; the centres of the powers of assimilation, growth, developement, &c., the *vitality* of a tissue would be in direct ratio, to the number and activity of its nuclei.

What are the relative numbers and what the activity of the nuclei in the dentinal fibrillæ or fibrils? What are the vital phenomena they exhibit and what are the changes they undergo? Eliminating all of the physical, all of the purely chemical phenomena, a close, rigid, logical reasoning forces us to the wall here also, and we must decide that dentine is vitalized in proportion to the nuclei of its fibrils and that the calcified cells and calcified nuclei have passed from the domain of the vital forces.

Fibrillæ are vitalized, but the calcified portions are non-vitalized.

That the calcified dentine is not a truly vitalized struc-

ture, seems to be beyond question, for its "Germinal Centres,"—"Germinal Material," nuclei and nucleoli are calcified and therefore utterly incapable of exhibiting vital phenomena.

The fibrils contain nuclei, &c., are vitalized, and do exhibit vital phenomena, and to a limited extent obey the laws of vitalized structures; but once calcified, they are forever beyond the domain of the vital, and any change therefore taking place in dentine proper results from far other than vital forces, inherent in the dentine. We make this distinction therefore, that changes in fibrils may result from vital or chemico-vital forces,—but changes occurring in dentine proper, result from a force extraneous, external, and not from any inherent power; unless—and here is a nice point,—unless the changes begin on the inner sides of the *so-called walls* of the dentinal tubes; i. e. begin at that vaguely defined boundary, between the calcified walls and uncalcified but still calcifying fibril.

If caries always begins here, at this point, or nebulous line between dentine and fibril, it is in close proximity to nuclei and we would infer that it was more or less modified by or dependent upon the vital force contained in the nuclei of the fibrils.

Does caries begin there? We will let Mr. Tomes answer the question.

"The connecting material ("intertubular substance") is usually first and the *walls* of the tubes *last*, to become disintegrated."—Dental Surg., p. 359.

Before passing on to a more critical examination of the subject, we propose to give the views of Dr. Beale as to the vital changes going on in dentine and enamel.

"These dental tissues, of all textures in the body, are those which undergo the least amount of change, and the statement that the material of which our teeth are composed is being continually removed and renewed, is a mere assertion, and utterly unsupported by facts or by sound arguments."—Structure, Growth and Life, p. 149.

"There is no evidence of the addition and removal of material going on in the enamel and dentine after the completion of their formation, and it is probable that the matter upon which the hardness of these tissues depends is not removed at all after its deposition."—*Idem p.* 150.

Neither then the organic base can be.

"When the enamel thus produced has reached a certain thickness, the germinal matter-nucleus, dies, the tooth passes through the gum, and the vital changes occurring in the enamel *cease forever.*"—*Idem p.* 175.

"Nor is there any room whatever for believing that the fully formed enamel is nourished or appropriates nutrient matter."—*Idem p.* 175.

Our readers will please mark well these statements, as they have a direct bearing upon the vital theory of caries.

"Now it would be said that when the vessels of the pulp are destroyed and nutrient matter no longer permeates the tooth structure, the entire tooth is dead; but it is doubtful if in such a case the enamel, the outer part of the dentine, the inner part of the cementum, are more *inanimate* than when the *tooth* formed an integral part of the living body, and was supplied with nutriment from the same living blood as the soft parts."—*Idem p.* 194

This is but a logical sequence of Dr. Beale's theory, of Structure, Growth, &c., and we here accept his views as applied to the teeth, for upon this point, practical experience and collateral evidence sustain his physiological researches!

The calcification of the "Enamel Columns," "rods," "elongated nucleated bodies," whatever we may call them the calcification of their nuclei and germinal centres, removes them from the domain of vital to that of nonvitalized structures.

The calcification of the "elongated cell," "rods," &c., of the superficies of the dental pulp, to form dentine, removes these also from vital to nonvitalized structures, so far as the calcified part is concerned. Where then exists the vitality of dentine? We answer in the fibrils alone. The fibrils exhibit all the necessary phenomena of vitality; nutrition, assimilation, conduction of sensation, &c.

But where does caries usually begin?

As regards cementum, we have little or nothing to say, as it is rarely if ever carious, unless the gum be removed, and external agents brought in contact with it; or caries extends from dentine to cementum. The consolidation of decay—is, even in cementum, external and therefore not a vital agency. This we take wholesale from Mr. Tomes.

"The disease may extend to, or may even commence in the cementum in teeth, from the *neck of which* the *projecting gum* has *been* removed; but these *are exceptional cases.—Dental Surgery, p.* 353.

This we implicitly believe, and only remark that the *agent* producing decay is an external one necessarily, as decay never occurs in cementum *first*, *unless* the gum be removed and the neck of the tooth thus denuded.

As regards structure, cementum is allied to bone; but Dr. Beale thinks dentine and enamel are homologous with epithelial structures.

"I look upon both enamel and dentine as calcified epithelial structures."—*Structure, Growth, and Life*, p. 173.

But the practical bearing of these refinements, as regards homology, are too slight to detain us in any discussion of fanciful theories.

We have omitted many points of interest in the history of the developement of the teeth; and also much of importance as regards defects of calcification, yet we have been too long in coming to the main point or question, i. e. caries. The fact is deprecated, but the work was absolutely required, before we could clearly comprehend the full bearing of the question, "the Essential Nature of Caries."

Predisposing Causes.

We give these as Mr. Tomes gives them; and as they have some relation to the question, it is well to repeat them.

Enamel Defective.—(1.) In quantity. (2.) In quality. Quantity deficient, as (*a*) pits, indentations, transverse groves, &c.—(*b*) defect in amount in the cusps, cusps small and enamel thin over the whole crown; (*c*) deep fissures between the cusps, extending down towards the dentine.

Quality.—Defective calcification; (*a*) defective fusion of the sheaths of the enamel rods, (very doubtful,) (*b*) defective calcification of the central portion of the rods; (*c*) small linear cavities through the central axis of the rods, (very rare.)

(3.) Blending of defects in both quantity and quality.

Dentine Defective—(*a*) granular and imperfectly calcified condition of the tissue immediately on the line of union of enamel and dentine; (*b*) Globular dentine, and interglobular, cellular &c., cells not calcified or badly calcified; (*c*) cavities in the dentine; (*d*) dentinal tubes (fibrillæ) running into cavities and dilating (bad at best, this statement, and not sustained by the anatomy of the part,) (*e*) "diminished density, and increased porosity," i. e. imperfect calcification. Well calcified, dense, hard teeth, resist decay; badly calcified teeth, soft and porous in structure, are more liable to decay, and decay more rapidly after once the process begins. Defects of this kind in enamel, are directly predisposing causes of decay,—defects in dentine however are not, and only give an easier substance *for already existing caries to act upon*, but never primarily predispose to decay, *unless* the dentine be uncovered by enamel, and the agent or cause has direct access to the dentine.

If the enamel be perfect—if it should accurately cover the dentine—if it be of normal thickness, we are decidedly of the opinion that caries of the dentine will not occur, *no matter* what the imperfections of the dentine may be. In plainer language—caries is produced by an external agent, and therefore if dentine be thoroughly protected by enamel, *decay never occurs there*, i. e. in dentine primarily.

A singular statement and admission is made by Mr. Tomes, as follows.

"Although the presence of defects in the structure of the dentine, no doubt contributes to hasten the destruction of teeth when attacked by caries, yet as a predisposing cause, *they are secondary in importance* to similar *faults* in the organization of the *enamel*."—*Dental Surg.*, *p.* 348.

Now this is the result of Mr. Tomes's practical experience and in direct opposition, as we shall find, to his theory of decay. By experience he has learned whence to expect the enemy; evidently an external agent, a force not vital as it is exterior to the tooth. A vital force would attack

dentine first, but here the approach through enamel is dreaded.

We endorse heartily, Mr. Tomes' apprehension of danger from an external agent.

We have thus far, arrived at three very essential conclusions:

1. The enamel is not vitalized.
2. The dentine (calcified) is not vitalized.
3. The agent causing decay is an external one.

We will now make a searching examination of the fibrils and a rigid analysis of the parts they play in caries. Let us be clear and explicit. We have shown that they are organically continuous with the proper tissue of the pulp; that they are nuclear fibres, or fibrillæ; they are the "elongated cells," "rods" and "bodies" of Tomes, Kölliker, and Beale, &c., which though not yet calcified are liable to be at any time. We also asserted that they were organically continuous with the calcified portion *called Dentinal Tubes*, and that a thin stratum, of, as it were, neutral ground, existed between wall and fibril; a nebulous line, possibly neither dentine proper nor fibril proper, but marking the transitional stage between the two; between the calcified and uncalcified, i. e. *a changing calcifying boundary.*

That these fibrillæ or fibrils are modified "elongated cells" or "bodies," cannot be doubted; they have acquired some new characters, but lost none of their essential characteristics, as elongated cells; their essential nature is the same. They contain nuclei, nucleoli, &c., therefore contain the indispensable conditions of vital action. What are the phenomena they exhibit?

1st. Passage of a nutrient fluid along the fibrils, and this in obedience to the force developed, in the chemico-vital processes of nutrition and assimilation, and in no manner dependent upon the heart; the force drawing plasma from the vessels of the pulp, is the same force that produces circulation in a vegetable cell, dependent absolutely upon the vitality of the *uncalcified working* nuclei;

should these nuclei die, should they be calcified, any passage of fluid to or around them is impossible, except by a physical force, as imbibition, or capillary attraction.

The vital element is lost.

2nd. Solidifying of the fibrils—calcification of the fibrils.

Tomes, Beale, Arthur, &c., assert, and dogmatically assert this change in the fibrils. Tomes calls it, the "zone of consolidation;" Arthur calls it, the "consolidation of dentinal tubes and fibrils in the space immediately beneath the caries." Both designate it as an effort of nature to arrest caries; they grant the complete obliteration of the tubes or rather fibrils; that is, they assert that a conservative effort is made to arrest caries; that this effort consists in the consolidation (calcification) of the dentinal tubes (fibrils,) to such an extent, that the dentine is denser, harder and more impervious to attacks, than even before the consolidation took place. Of course the degree, or the completeness of the consolidation, is the measure of its power of resistance. We call attention, marked attention to a quotation from Mr. Tomes' work.

"The zone of consolidation *cuts off* and *isolates* the diseased from the healthy portion of the tooth, and its production must be regarded as an attempt on the part of nature to circumscribe and limit the mischief."—*Dental Surg.*, p. 364.

(To be Continued.)

ARTICLE II.

Root Filling. No. 2.

By A. B. Brookins, D.D.S.

The "so-called" conservative treatment having already received more consideration than it deserves, notwithstanding the prominence given it by certain reputable practitioners, we will now proceed to see what good there is in the rational system.

Different operators embrace different methods, not only in the selection of devitalizing agents, but in the preparation of the canals; some use hooked, others barbed instru-

ments, while their patients are under the influence of gas; others dispense with the gas and with a slight of hand thrust an armed stiletto through the pulsating commissure, on through the canal stopping only at the bottom of the alveolar recess. Others again use the more humane means, arsenious acid—the *sine qua non.*

I need not mention the occasional use of the potential and actual cautery, which, however, should never leave the hand of the operating surgeon—cobalt, carbolic acid, &c., have had their advocates, but cannot be relied upon.

I am in possession of no peculiar or specific way of applying the acid further than to see that the medicine is in contact with the part to be devitalized, and do not trust it to be absorbed through a layer of dentine—the nerve should be exposed as much as possible without wounding the vascular structure; should this occur the hemorrhage should at once be arrested by the application of creosote, applied on a dossil of cotton, or better on a piece of bibulous paper. The tincture of camphor will do just as well, and be more acceptable to the taste of the patient. A preparation composed of arsenious acid, sulphate of morphia and creosote sufficient to saturate the compound, is a common devitalizing agent. A small quantity of the medicine is placed immediately on the exposed nerve, and covered loosely with cotton, saturated with sandarach varnish.

The use of this stopping has been objected to on account of the supposed solubility of the acid in the varnish, and the diffusion of its effects along the canal, destroying its lining membrane, &c. I have not found this to be the case, but like everything else, it must be done with care, and in no haste. A more eligible one I think cannot be used; wax and Hill's stopping being too hard, not unfrequently produce pain, and you are compelled to do your work over again. The medicine is allowed to remain from 12 to 24 hours, after which it is taken away, and the devitalized nerve removed as far as the foramen or mouth of the dental canal,

and should there be no inflammation remaining, the gold can be at once introduced, though I prefer waiting 24 to 36 hours, lest a secondary inflammation developes itself when too late to give it successful treatment. I prefer introducing a roll of cotton of sufficient size and length, the end saturated with creosote water, as far as the foramen, taking care not to pass beyond the apex—the crown should always be kept closely filled with sandarach, wax or Hill's stopping. *The keeping out of oral fluids from the canal is at all times essential.*

Should much inflammation remain, undiluted creosote should be repeated every day till all soreness is removed. But suppose the patient applies with a devitalized organ—suppurating from the action of natural causes, that is to say, as a sequence of inflammation arising from the presence of non-destroying medical agents, or if you please from injudicious treatment.

There are several things to be taken into consideration before we can institute any course of treatment with benefit to our patients, or with credit to ourselves. What is the general health of the patient? Is he anæmic? Increase his hematin. Is there struma or a cachectic diathesis? Let your general remedies be the adjuvants of your special course. Does the patient urge penury? Divide the profits with him. "Turn not away your favor from any poor man and the Lord will not turn his face away from thee." But we find different local conditions obtaining as well as general in different cases—from congestion to suppuration—from acute to sub-acute inflammation. The affection confined to the walls of the canal, including the lining membrane; to the tubular organization producing the congestion first observed by Profs. Harris aad Johnston of Baltimore; to the soft parts of the alveolo-dental recesses, to the Crusta Petrosa and contiguous structures, or in the dental nerve (in the canal) with or without dental fistulæ, abscess, or adventitious growths, all of which may result from natural causes unassisted by artificial in-

terference though more frequently from an unpardonable practice among some dentists.

Simple inflammation when confined to the membrane of the canal, or its preceding stage, congestion after the removal of extraneous matters, also pericementitis or any unclassified subacute inflammation outside of the dental canal, when it has not taken on the suppurative condition, may be treated with safety and success by cold water thrown along the canal to its apex. Two or three currents may be thrown at a time and repeated every 8 or 10 hours, keeping the crown well stopped with a temporary filling ad interim. In the suppurative stage we should be careful how we use cold water or in any way change the temperature; the evidence of reputable dental pathologists to the contrary notwithstanding. I object to its use for the same reason the hospital surgeon, in his wards, rejects it from his suppurating surfaces. My friend Dr. Balderston of Baltimore, favors its adoption and says:—

"I am sure a method of treatment is arrived at so perfect that any tooth may be restored to health and filled without any danger of abscess. But it is the most careful and tedious operation the dentist has to encounter.

"If the patient calls with the nerve already devitalized and probably abscess, by cleansing the cavity and removing the debris in the canal with a suitable broach and daily syringing with *cold water*, reapplying cotton to keep out foreign matters from the crown—the abscess soon cures in from ten to fifty days, when with floss silk we fill the canal, and with tin the crown, to remain as a temporary filling for two weeks or longer. Should there be at any time signs of uneasiness in the tooth after the temporary filling has been introduced, the patient is directed to call at once and have it removed and previous treatment renewed; if allowed to remain it will form abscess."

After a trial of the creosote treatment on suppurating surfaces along the canal, in dental fistulæ and abscesses

and also in pericementitis and in over forty cases, all restored to health and filled in from four to ten days, in one fourth of which the original form was restored with solid gold, thus subjecting them to additional liability to subsequent inflammation had any morbid disposition remained, I do not feel disposed to adopt one apparently so incongruous; certainly not if it takes fifty days to do the work otherwise accomplished in ten.

The following is the method of treatment I have adopted, not differing, in general from the course pursued by Professor Gorgas of the Baltimore College of Dental Surgery, except in a few points as will be suggested as we proceed.

At first sitting of the patient, granting the dental nerve has been devitalized and its commissure removed from the crown, an untempered instrument prepared for the individual case, of proper size and having a hook sharp at the point so as to catch readily the object you wish to extract, feeling satisfied with what it brings away, and continuing with unruffled patience and unwearied hand till we arrive at the dental foramen. Do not be in a hurry nor fatigue the patient; if he wearies, you should introduce a little creasote water on cotton as far as you have reached, stop up the crown and arrange for another engagement. There are three points right here that claim special consideration, either of which if lost sight of will protract your labors or result in failure.

1st. Do not let the points of your instrument be in such relief as to tear the dental membrane, which it must be remembered is exceedingly delicate, continuous with the alveolar dental periosteum, not only adherent to the parieties of the dental canal, but sending off linings to the dental tubuli of Kolliker and forming cul de sacs in the "calcigerous" cells of Huxley or the "enamel" cells of Johnston. Within the hundreds of thousands of these tubuli are nerves, and whenever we find nerves, we must

necessarily have blood-vessels, though the blood may have neither hæmatin nor fibrin and only the plastic elements of nutrition, the plasmatic fluid of some of the German Physiologists necessary to perpetuate the vitality of the parts supplied.

2nd. Do not allow any disorganized nerve or other detached fragments to remain in the vicinity of the foramen or along the parieties of the canal expecting them to come away in subsequent treatment.

3rd. By all and every means suffer not your instrument to pass beyond the mouth of the canal other than for the purpose of ascertaining the length of the canal, for which should be used a most delicate measure having the points turned at a right angle, which is very short and as it passes out a peculiar "expression" is given which is not easily misunderstood. But there is another more diagnostic and emphatic: the angle of the instrument readily embraces the apex and requires a gentle force to extract it, whilst in this embrace the distance can be taken on the shaft of the instrument which is to guide you in your subsequent treatment and in the introduction of the gold.

After the canal has been properly cleansed from foreign matters creosote is applied to the mouth of the canal on a piece of cotton rolled out, having such diameter as to be readily admitted, leaving one end outside for convenience of extraction, and the cavity in the crown so carefully stopped that oral fluids cannot permeate it. I prefer the sea island cotton to floss silk, the latter being too elastic and apt to be withdrawn with the instrument and for the same reason is introduced with less facility.

This dressing is allowed to remain from six to twenty-four hours, the former if treating abscess, fistula, &c., when much suppuration is going on, when it is removed, the canal made dry, and the treatment repeated, until all inflammation passes away and no sensibility upon percussion remains.

I now feel at liberty to proceed with my work of introducing gold along the canal to the foramen, and the same caution becomes equally important here as in the preparation of the organ, not to let any spiculæ of gold get *beyond* the apex. I see no necessity as some recommend, of allowing a pellet of cotton containing creosote to precede the gold, but on the contrary is, I doubt not, the cause of many failures. After the canal is filled I do not proceed at once to fill the crown and perhaps restore the surface or surfaces and angles, preferring to give the organ a little rest, after which the crown is properly prepared for the reception of the permanent filling, and following Dr. Atkinson who is always good authority, all difficult cavities are reduced to simple ones.

We are told it is prudent but not necessary to give the organ rest after this manipulation. I declare it both prudent and necessary, for however well the primary affection may have been treated, a secondary may be developed and all our care will bring us no reward. Right here I will say a word with regard to what I deem the most expeditious as well as successful way of introducing the gold along the canal. In the first place let your instrument be nearly of the size of the diameter of the canal and untempered so as to adapt itself to any change of direction it may assume other than direct angles, the point having a positive plane surface to force the gold directly to the mouth of the canal; tear off from the strip folded from No. 4 or 6, just the quantity as will proceed along the walls without condensing before it reaches the apex; your measurement will guide you; after this is well condensed another piece is advanced in the same way till the canal is filled. The tooth should be supported by gutta percha when the crown is being built out, or any of its surfaces. It should be used in all cases of restoration of the crown whether the root has been the subject of treatment or not.

But suppose the patient consults you for a tumor in

the dome of the arch extending from the foramen incisivum backwards along the palatine suture, giving through its attenuated walls evidence of its purulent character. Taken together with the history of the case, there is no difficulty in making a correct diagnosis and finding that one or more of the incisors has been the subject of an injudicious "plug;" that the nerve was devitalized in the usual way; and receiving the stereotyped response "the doctor gave me some medicine (?) to rub on my gum if it got sore, though he assured me I would not need it, and the result has been that I have suffered agony for days and weeks." The "plug" is at once removed and the canal cleared of barriers to the free egress of pus; tepid water is then injected up the canal taking care not to throw it into the already distended sac, when the pus will freely follow the escape of the water, and the tumor relieve itself through the elasticity of its walls. A roll of cotton, the end of which is saturated with creosote is then passed up to the apex and allowed to remain; the cavity in the crown is also filled with cotton to keep out foreign matters. At the next sitting I inject the tumor with creosote and pursue the same treatment as before. It is not well to inject more than once in 24 or 36 hours, and I have never found it necessary to inject beyond the second or third time.

Again, suppose we find in the oral vestibule a hanging pocket presenting one or more openings through which passes, upon pressure, a cheesy granulated seropurulent secretion? I have just dismissed a case of this description. The patient a young lady, aet. 18 the daughter of an eminent clergyman, was the subject of *maltreatment* 12 months since; for weeks she suffered agony till the pus discharged through the mucous membrane in the vestibule over the buccal roots of the first superior left molar; an adventitious growth had formed to half the size and shape of an almond, hav-

ing several fistulous openings, and upon pressure discharged freely a consistent granulated pus, which afterwards became more fluid.

The most expeditious and advisable method of treatment for these compound cases is

1. Remove all obstructions to a free transmission of pus through the dental canal.

2. Clip away the adventitious pockets with the scissors taking care not to extend the sac with the forceps used in the operation; if you do, you will be liable to cut away the mucous membrane. The slight hemorrhage is easily controlled by the application of one of the solutions of the salts of iron.

The further treatment will be essentially the same as that instituted above in the case of abscess of the arch, excepting that the creosote may be thrown through the dental canal along the walls of the fistula, immediately after the excision of the *cul de sac*.

It has been proposed to fill the canal with gold as soon as sensibility is removed from around the root of the tooth, which is indicated by percussion, and treating the fistulous opening externally, or leaving it to cure itself; for nature to repair her own solutions of continuity. This is objectionable because of the universal disposition obtaining in fistulous ducts, to heal from the superficies to the bottom, unless you control the granulations. Now suppose you have filled the canal with care and credit so far as the operation *per se* is concerned, and union by second intention is effected in the mucous and even in the submucous tissue, you have then admirably succeeded in covering up with inflammable structures a slumbering fire, an explosive volcano with mutterings and pains longing to be delivered.

I had proposed to speak of two other conditions we not unfrequently find, but this paper is already too long, and I would prefer learning from another far more

competent to instruct, the treatment adapted to their pathology.

ARTICLE III.

Dental Education. No. 2.

By Professor Austen.

In the first paper of this series, it was shown, briefly—that education was something more than mere instruction: that it implied the co-operation of the student and demanded a measure of talent and industry in the taught, as well as in the teacher; and that professional education could not be effective without preparatory mental training. Hence the definition given. "The selection and preparation of professional material." The importance of selection, as preliminary to the education of students has been shown and in the next paper some of the methods of education will be considered. It is proposed at present to inquire into the means taken by a profession to discriminate between its members: also the object and wisdom of such discrimination.

It is scarcely consistent with American ideas of liberty to forbid any one the practice of any profession he may fancy himself equal to. In the absence of governmental restrictions, the professions must depend, for the maintenance of their standard, upon the carefulness with which they recognize the claims of membership. To this end societies, associations and colleges are established, laying down the conditions upon which, respectively, they are willing to acknowledge "fraternity and equality" and most of them issuing certificates of such acknowledgment—termed diplomas. Such diplomas have a value purely relative; and the letters, which they permit one to affix to his name, have no significance, apart from the body which grants the permission.

Associations for mutual improvement are valuable as educational instruments; but their diplomas have no meaning except as certificates of membership, unless they are based upon examination: or unless they are given in unsought acknowledgment of talent and position. Diplomas of this class measure the judgment of the grantors in the *selection*, not the *preparation* of professional material.

Such associations have doubtless a right to establish the conditions upon which they will pronounce men worthy of their honors. The worth of the honor is quite another question. One might be justly proud if elected "Corresponding Member" of the French Academy: yet not care to boast of an F. C. S. granted by some obseqious, patron-seeking, mushroom society. An L. L. D. should imply in its possessor a decent regard for, and a very thorough knowledge of, law: but what significance can these letters have when affixed by a sycophantic institution to some Bombastes Furioso, who notoriously tramples upon every law, human and Divine!

We have here *two* classes of diplomas. ONE, a simple certificate of membership, implying that its possessor is desirous to benefit himself by interchange of ideas; communicating, it may be hoped, as freely as he receives. Such diploma has a value, as distinguishing a man from that unprogressive class, which thinks it has nothing to learn and keeps what it knows to itself. It is evidence of one step taken in education and progress. As an evidence of professional ability it is absolutely worthless. The OTHER asserts for its owner the possession of superior qualification. This assertion rests for its value upon the consciencious truthfulness and professional knowledge and acumen of the examining body. Hence, such diplomas have values of extreme diversity, according to the sources whence they issue.

A THIRD class of diplomas is the award of some teacher

or body of teachers. It certifies that the person named therein has creditably passed examination, after a prescribed course of study and practice, such as, in the judgment of the teacher or teachers, is sufficient to warrant admission into the professional ranks. The teacher assures the profession and the community that the student has for a specified time been engaged in study, and has given satisfactory evidence that he has made diligent use of his time. These diplomas have also values widely different, according to the estimation in which their grantors are held. They have a character wholly different from the two first, and should bear upon their face some mark of this distinction. In their influence upon professional advancement they are by far the most important, and the persons or associations conferring them should be careful how they mar their influence, or create confused ideas of their true character, by conferring degrees of any other kind.

Pursuing the analysis further, these three classes may be embraced under two divisions. 1st.—Complimentary acknowledgment of merit. 2nd.—Certificate of the faithful pursuance of a certain course of professional study.

The first class may, in the comparatively new profession of Dentistry, be considered as a well earned tribute to its pioneers. Also, if charily and judiciously conferred upon acknowledged high skill and ability, or for distinguished service, it may be useful as an incentive to active genius in the rising generation. It should be so wholly different from the second class as by no possibility to be confounded with it: but rather become an object of ambition to those who hold the latter. If it convey a title, or add initials, these should be distinctive and the parchment itself should present a widely different appearance.

It may be very philosophical to despise titles and speak contemptiously of "bits of colored ribbon." The fact remains that appreciation of worth is very sweet to the

wisest and greatest, and its tokens are highly esteemed. It is only when we seek the title or ribbons without possessing the worth, that we become justly the butt of the philosophers. And when conferred indiscriminately or profusely they are emphatically "empty letters and bits of silk," not worth the acceptance of any sensible man. Specially contemptible are such honors, when confered by any literary or professional institution, with a view to secure influence, or lift itself into notoriety.

Honorary Diplomas, medals or ribbons are worthy objects of ambition in proportion to their value, which depends solely upon the grantor. Knighthood is most prized when coming from that monarch, who is chary in giving, with his sword, the stroke of honor. Social distinctions, marked by garters and ribbons, are always prized, when coming from "majesty," the fountain of social honor. But when a professional man exhibits his array of gold snuff-boxes, diamond rings and medals, the gifts of crowned heads, in evidence of his professional skill, we say, with the old painter "*ne sutor supra crepidem.*" Yet Victoria's grateful memento for the relief of a tooth-ache is worth even more, as a token of merit, than the Diplomas of Institutions, which confer the same to gain prestige or popularity.

There is a third kind of diploma conferred by some colleges upon "examination" of Dentists, who have been in practice for a certain number of years. It is neither the award of distinguished merit nor the certificate of the well drilled tyro. It gives none of the eclat of an honorary degree, and it robs the student's degree of its meaning, by being confounded therewith. Its occasional occurrence, under peculiar circumstances may be perhaps excused or palliated. Its adoption, as a principle, by any Institution, should be deplored, as tending to foster in the profession an unworthy craving after title for title sake.

If this degree is judicious the plan cannot be too universally carried out. Now let every Medical school advertize for candidates, who are willing, without pursuing a

specified curriculum of study, to undergo the ordeal of examination, as severe as the average of such trials by medical Faculties—the only requisite being that they shall have practiced medicine for a certain term of years—how, or where, or upon what principle it matters not, if only the momentous questions crowded into a few hours examination are satisfactorily answered. There is not a high medical authority in the country, but would pronounce this step a retrograde movement, most injurious to the cause of medical education. That there are so many inferior medical schools; that the majority of medical graduates should tremble before a board of Army and Navy Examiners; that we trust the lives of our wives and children to practitioners, who would not be considered competent to attend soldiers and sailors: that most Prussian graduates, just out of the schools, have a better knowledge of the theory and practice of medicine than many of our medical Professors is all bad enough, without converting a host of charlatans into Doctors of Medicine by the magic wand of a brief examination.

If bad in Medicine, the scheme is bad also in Dentistry; although the position of the two, relative to titles and colleges is different. The untitled physician ranks with charlatans; for within the memory of this generation, graduation in some school has been universally regarded as an essential pre-requisite to honorable practice. But the oldest (Baltimore) Dental College dates back only to 1840. The physician who can show no diploma looses caste, because of the inference (wrong only in a few exceptional cases) that he has not used all available means of acquiring a knowledge of his profession. But no dentist 30 years ago had any dental title; comparatively few had a medical degree. The profession was imperfectly organized and its terms of initiation vague. This class of dentists hold their reputation independent of any dental diplomas. Some among them may have accepted Honorary degrees; but the remainder lose no caste by the absence of a kind of

degree, which, if universal, is no longer honorary. These SENIOR members of the profession compromise the dignity of their position, when they seek the honors granted by Dental Colleges.

The same remarks apply with nearly equal force to all dentists in practice during the ten years (1840—1850) when collegiate training was contending for an acknowledgment of its necessity. Of this second class, many, after years of practice, attended lectures in dental colleges. Their titles are an honorable evidence of their earnestness in the pursuit of professional knowledge: yet no occasion of reproach to those who did not feel this necessity. Whilst the first class are above the benefit of the diploma, the second class may rightly hold themselves indifferent to it.

Of a third class—those entering the profession, (1850—60) when the number of colleges had increased, and their importance very generally acknowleged—it may still be said, absence of title is no disgrace. But from this point let the lines be drawn: for the purpose of fairly testing most important questions of dental education, and not in any spirit of rivalry or disparagement.

Let the D.D.S. mark the practitioner, of whose training one or two sessions in dental colleges has formed an essential part. Let the M.D. mark those who have studied dentistry as a medical specialty; and let the absence of title mark those, who are content with the experience gained in an offiee. Let each preserve its distinct insignia and neither seek to borrow the badge of the others.

When the profession and community shall have decided that any one of these systems, say the collegiate, is the best and should form an essential part of dental education, then may the medical law be applied and all untitled practitioners be ostracised.

Meanwhile let dental colleges refuse the degree to all who do not actually receive instruction within their walls. Let them be restricted to their specific duty—the education

of students; doing this in the best possible manner, using their diploma simply and solely as an evidence of that fact; and leaving to the future all decisions as to the superiority of their teaching. Used in this way, the diploma has a very important significance, assuring a more speedy solution of the educational problem.

When a college quits this, its proper sphere of action and sits as judge upon dental practitioners, not its students, it arouses miserable jealousies, robs its own diploma of its true import and takes from the regular student a laudable incentive. It may thus widen its circle of active patrons and increase its list of students and graduates. But whilst apparently making the collegiate system more popular, it brings it into disfavour with a large class of best practitioners, who deem it an insufferable arrogance in any collegiate faculty to cast this implied slur upon their professional position. For as matter of course, if the seal of this examining body gives *eclat*, its absence is a reproach. Differing essentialy in this respect from the student's diploma and the honorary degree, it becomes a mischievous source of ill feeling, calculated to bring all diplomas into disrepute.

A society may with propriety issue its certificates of membership. An association may adopt forms of examination to prevent the intrusion of unworthy members. A college may issue its certificates of faithful attendance upon prescribed courses of study. They may all occasionally compliment talent and skill by parchment or medal. These are legitimate exercises of privilege; but when any one of them calls upon the profession at large to present themselves "for examination," it provokes inquiry into the peculiar attributes of this professional Supreme Court, by whose decisions they are to stand or fall. If a congress of dentists should meet and appoint a committee of examminers, they might award a diploma which would serve as a sort of "standard measure:" but the attempt of any self-chosen board of review to apply such a standard will be

resisted. It is an injustice to the cause of education to connect it in any way with such unwarrantable assumption of superiority. Earnestly protesting against such a combination, as being opposed to the true aim of dental education, we pass to the consideration of some of its methods and instruments.

(To be Continued.)

ARTICLE IV.

Dentistry as a Fine Art. No. 5.

By NORMAN W. KINGSLEY, Professor of Dental Art and Mechanism, in the New York College of Dentistry.

Our last two articles, as the reader will remember, were devoted to a consideration of the forms of teeth and their arrangement in the arch, with sole reference to their beauty and natural appearance.

Those considerations, important in themselves, are relatively of far less consequence in an artistic sense, than the subject of the present paper.

The peculiar form and position of each tooth is of minor importance compared with the contour of the whole system in its relation to the external features.

The form of each tooth may be all that art requires; the color and arrangement, of the most deceptive character; the mechanical execution, superior; and yet if the original expression of the features is not restored, or one equally pleasing substituted, the whole contrivance as a work of high art is a failure.

The highest attainment of mechanical skill, is not incompatible with the requirements of art.

All that good taste suggests, can be obtained without the violation of mechanical laws.

A thorough mastery of the mechanics, is the best foundation for the art. The mechanical and the artistic are so intimately related that it is impossible to separate all

the essential conditions of art from their association with mechanical skill.

But as mechanical excellence ranks below artistic, it is not uncommon to find the requirements of the former only, fulfilled. This article therefore, like those preceeding, pre-supposes that in making an artificial denture, all that mechanical skill can perform, has been, or will be accomplished.

In the sculptor's art, every excellence desired in the finished marble, must be wrought out in the plastic clay; every thought which form or feature is required to express must provided for in this model.

In our art all this, is also done in the earlier stages of the process. The final appearance must be determined in the easily wrought model at the time that, what is technically called "the bite" is taken.

It matters not of what material the plate, or base of support be made; gold, platina or gutta percha, the same process of ascertaining the length, breadth and fulness must be prosecuted. This is the most trying and critical point in the artistic construction of the piece. On this model we may well devote anxious thought and study. Here we concentrate all our resources; display our knowledge, taste and judgement and proportionate with this exercise will be our success.

The moulding of faces into an ideal form is not alone the work of the sculptor, neither is the only material inanimate clay. The living subject in the hands of the dentist may often be changed by his skillful art from repulsive deformity into beauty and loveliness. Not only may the organs of mastication be replaced, together with the charm which, (when well formed) their presence always gives; but haggard and sunken cheeks may be made young again, lips contracted and expressionless from want of support may be arched and made full, a chin whose character has been destroyed by an alteration in the associated features will have its character restored

the mouth will again receive the power of becoming eloquent and even the nose will share in this pleasing transformation.

Thus nose, cheeks, mouth and chin, may be modeled over, and again made to approach the divine.

It is not the insertion of teeth, however beautifully formed, that will work this revolution. The most perfect substitutes ever conceived may be so ill-adapted as to increase the deformity and cause an expression at variance with the character and a lasting libel upon it.

The alveolar processes which supported the muscles of the face and thus contributed to its expression ; now wasted and gone, must have a substitute and no unskillful hand is required to model up this form.

In re-modeling this living face all the resources of ideal art should be at our command. The esthetic sense should be cultivated by a familiarity with the best productions of art in all ages, together with a knowledge of the feelings and motives which prompted their production.

It was a favorite effort with the Greek sculptors to represent man deified. In the form and expression of their gods they rejected as far as possible the grosser characters of the human countenance. Their deities were built upon the human mould, for the finite mind can have no higher conception of a form possessing moral and intellectual attributes, than that, which the Great Creator has given to his noblest work, man.

To idealize this head therefore, and give it the attributes of the divine, unclouded by human infirmities constituted the highest exercise of their talents.

By what process of reasoning this was accomplished will be most interesting to note.

It has been maintained by some that this can only be the result of long acquaintance with the human face, until the artist has acquired that good taste and judgement which enables him to select from a variety of individuals and combine in one representation, a collection of

beauties. This would certainly produce an ideal head of great physical beauty; one probably never seen in nature and yet it is difficult to see why it should lay any just claim to the divine. It may be extra-human but not super-human.

There can be *no* conception of the divine.

Winckleman thought he recognized in the Greek gods certain of the nobler features of the animal creation, indicating that they invested their deities with those attributes of the animals which they most feared.

There is a coloring of probability in this, as we know it was a favorite idea of many heathen nations to enshrine their deities in the forms of animals.

Winckleman's idea of the Greek seems to be a refinement of the pagan, in the endowment of the countenance of man with the attributes of the animal. He instances the head of Jupiter, in which he sees the forehead of the lion.

But Sir Charles Bell gives what seems a more rational theory of the perfection of the Greek statue.

It was not found in the combination of individual beauties however excellent; not in actual expression, since in many cases the gods were representented as superior to the emotions of the human heart and in the majesty of repose; not in adopting from the animal anything that was not common to man; but, in the exaggeration of those attributes which are purely human.

Hence, by observation we may discover how the excessive developement of certain features degrades and beautifies the human countenance, and *vice versa* how we may improve and ennoble it.

For example let us take those features or organs that are common to man and beast. Beginning with such teeth as are exposed to view; exaggerate the incisors, and we have the teeth, appearance and expressive of the graminivorous animal.

Enlarge and make prominent the canine teeth and the seizing and tearing propensities of the carnivorous animal

are developed; give undue breadth to the jaws and strength to the masticating apparatus and we have the face of a lion; increase the size and action of the levator muscles of the upper lip and we have the snarling and irascible expression of the tiger; give undue prominence to the lower part of the face; the intellectual character is degraded; the animal predominates.

Reverse now these suppositions, modifying and softening all these features to the minimum consistent with their nature and uses; add to these the features and develop such attributes of the man as he does not hold in common with the animal, and the face approaches the most exalted human idea of the divine.

Form the mouth therefore with a view to the intellectual exercise of speaking rather than for the gratification of the animal passion of feeding. Strengthen those facial muscles which are not found in the brute; whose sole object is human expression. Let the base be sustained by a well developed chin; crown the whole with the sign of intellect, a full forehead approaching to the perpendicular line of the face, and the human countenance becomes distinguished from the brute.

Some Physiognomists have carried this doctrine so far as to affirm that any resemblance to the brute in the human countenance implies degradation of character, and profess to discover in the man such characteristics of the animal as some particular feature or his whole countenance suggests. But this can hardly be true, for when we come to analyze the cause of those impressions we find that it is not, that any particular feature, or that the whole countenance, is, in form, strictly a likeness of the brute, but rather, that by the operation of the fancy alone, the animal is suggested.

It is this association of a human feature with the function of the brute which implies degradation.

This associating power of the mind constantly influences our opinions.

In the abundant caricatures of public men of the

present day we see this verified. The skillful artist will take the most intellectual of faces and suggest the animal with but few strokes of his pencil, and without destroying the likeness. If a feature be exaggerated whose function be allied to intellect, we ennoble and dignify it; but the exaggeration of an organ whose function is purely animal degrades it, and it is incompatible with the superiority of the human countenance.

Of Beauty in the abstract, writers on art have been able to affirm only, that it is the reverse of deformity.

Sir Joshua Reynolds held, that every face had in it the elements of beauty, and that to attain that beauty, it was but necessary to soften some of the features, without destroying the likeness. While this may be true of a picture or a statue it is manifest that the doctrine cannot be applied to any extent to the living subject. Beauty in the human countenance is of two distinct characters;—beauty of form, and beauty of expression.

The former is cold, mathematical, uncompromising; the latter living, animated, divine. The former is predetermined and hereditary, governed by laws beyond our control; the latter is the fruit of the affections, the creation of ourselves.

The bones of the head determine its shape and in the normal adult admit of no modification. The muscles of the face govern the expression, and this beauty, an emanation of the soul, may be cultivated without limit.

As the soul is nobler than the body, so beauty of expression transcends that of mere shape.

As all our faculties develope with their exercise, so must the constant influence of the affections modify the expression and spiritualize every face.

Thus over the homeliest of features, judged merely by physical types, may be hung a veil of spiritual beauty which transfigures the physical, and compels all who behold the purified and irradiated face, to acknowledge in it a beauty not born of the dust, out of which the perishable

body is made, but of that divine essence which constitutes the immortal Soul.

There is a doctrine advanced by phrenologists, that the configuration of the head undergoes a change under the protracted influence of the emotions, and the developement of the mental faculties; not alone that the expression of the face may be permanently altered, but that the cultivation of all the nobler faculties will work a transformation in the brain case; in the very bones themselves; while *per contra*, an abandonment to all the baser passions will increase its brutal character. These results will unquestionably be exhibited in the *expression* of the face, but its configuration as determined by the bones remains substantially true to its type through life.

If *any* modification takes place it is not sufficient to transform an ugly feature into one of beauty.

The frequent illustration of the aged couple living together in harmony until their habits, actions, voices, and looks correspond, proves nothing for feature, but all for expression.

As the bones of the face determine its type, and as beauty in the form is dependent upon their shape; observation teaches us that in a vast majority of the human species, this beauty in all the features is unattainable by the adult in his normal state.

In the growth of the face, as we have seen, the excessive developement of the jaws, alveolar processes and teeth, contributes more to the brutal aspect of the countenance than the exaggeration of any other feature.

Judged by any standard of physical beauty, great depth of face from the nose to the chin is a deformity. Protruding jaws and prominent teeth, with lips that find difficulty in covering them, is still worse; a receding lower jaw and chin is lacking in dignity, while a full lower jaw and retreating upper lip, takes from the mouth its intellectual character.

In a narrow jaw with two prominent front teeth, we see the rat-like look of the *rodentia*.

In the mouth and its immediate surroundings, caricaturists find the greatest scope for their pencils.

When Michael Angelo in his great picture of the Last Judgment, portrayed demons, he enlarged and exposed the canine teeth, and gave the savage and ferocious look of the tiger, an expression too, not at all at variance with human physiognomy.

These phases of man's countenance to a greater or less extent, are within the daily observatien of almost every individual.

When these things occur in the child, or when the loss of the teeth and alveolar processes supervene in the adult, the singular privilege is granted to the dentist, not only of redeeming that which is wanting, but in very many instances of attaining that which is artistically superior. The present advanced stage of Dental Science and Art, furnishes abundant means to measurably correct most of these deformities.

In the child of ten or a dozen years of age, the alveolar processes, and the consequent position of the teeth, may be moulded into almost any desirable form, and the whole contour of the lower part of the face changed.

The ability and good taste required of the dentist in practicing these higher branches of his art, must be founded on a knowledge of the anatomy of the muscles of the face, their functions, and the philosophy of their outward manifestations.

It is all-important in any attempt at restoration, that the muscles have free play.

Nothing is more palpably opposed to expression, than constraint. Hence it is often the case in our art that a decided improvement may be made in the form of a feature but its most pleasing expression is destroyed.

A naturally retreating upper lip may be filled out and its beauty greatly enhanced, when simply its shape is contemplated, but the graceful action of its muscles is interfered with and the nobler and more important beauty of expression is sacrificed.

Expression is then, of paramount consequence.

In this exhibition of the emotions upon the human countenance all the muscles connected with the *orbicularis oris*, are muscles of expression, and some of them seem to have no other office.

Sir Charles Bell, says, "The character of human expression in the mouth is given by the *triangularis oris* or *depressor anguli oris*, a muscle which I have not found in any of the lower animals. I believe it to be peculiar to man and I can assign no other use for it than that which belongs to expression"

"The *triangularis oris* arises from the base of the lower jaw and passes up to be inserted with the converging fibres of almost all the muscles of the side of the face, into the corner of the mouth; it produces that arching of the lip so expressive of contempt, hatred, jealousy; and in combination with the elevator of the under lip or *Superbus* and the *orbicularis*, it has a larger share than any other muscle in producing the infinite variety of motions in the mouth expressive of sentiment."

"In speaking there is much motion to the lower lip; consequently much activity in the muscles which form the fulness of the chin, yet a remarkable variety is produced in the lines which mark the features about the upper lip, by the play of the different muscles which converge to the mouth from the margins of the orbits."

The levator muscles of the upper lip, produce at times the finest action ever witnessed about the mouth.

We are so familiar with these exhibitions that they pass unnoticed, yet if we were to try the experiment of reversing faces in our observation we should be struck with the wonderful activity of the human countenance.

None of these muscles are directly concerned in the expression of the meaner passions which govern the brute.

The office of the *Zygomatic* combined with the *Buccinator* is chiefly to raise and retract the angle of the mouth.

These muscles which are common to man, and the car-

nivora have much the same effect when in action. If therefore when the lip is raised by them, a long, prominent, and pointed canine tooth is exposed to view, a snarling expression is given, suggestive of the malignant passions.

Expression is not the result of the action of any single muscle, but rather of the combined action of the aggregate: and, not altogether by their contraction; but by the tension of some, and relaxation of others.

As the natural tones of the voice are universally understood without respect to speech; so do the movements of the features appeal directly to all; like the brand of Cain, the heart is indelibly stamped upon the countenance, and its emotions are read in a language which needs no interpreter.

(To be Continued.)

CORRESPONDENCE.

Letter from Paris.

PARIS, *July* 31st, 1867.

MESSRS. EDITORS:—

IN a paper addressed to the Academy of Paris by Dr. Rosenthal of Ulm, a very important and perhaps a useful circumstance is brought to light.

Dr. Rosenthal having effected some experiments on a poison brought over from Malacca, and exercising an elective action on the heart, discovered that it acts with less intensity on fowls.

As this poison contains a large proportion of strychnine, he resumed his experiments with that poison in a *pure state;* its characteristic property, as you are well aware being that of producing tetanus.

Our author thus succeeded in determining the quantities of strychnine requisite to produce death in different animals. The doses do not differ considerably, though

they are not absolutely the same. The ingestion of the poison was always effected by the mouth, and in the shape of a watery solution.

Rabbits require a milligm. of nitrate of strychnine for every 500 gms. of their weight; guinea-pigs, sparrows, and pigeons will absorb double that quantity before they die; chickens, on the contrary, will bear nearly twelve times that proportion. On this occasion, Dr. Rosenthal observed that by establishing artificial breathing in rabbits, so as to suppress all natural motion on respiration, they might be made to bear much larger doses of the poison than in the normal state. Under such artificial action the animal will walk on the table as if it had taken no poison; but no sooner is artificial respiration suspended than convulsions will begin again very rapidly and worse than ever. If artificial breathing be again applied, the fits will cease, and the animal return to its normal state. Hence it appears that a poison may be dormant in the blood of an animal, without producing its effect. And yet the poison has not lost its power, since it can resume it as soon as the artificial action is suspended. This shows that an abundance of oxygen in the blood will paralyze the effects of the poison, which thereby may be so completely neutralised as to save the animal's life.

This may be done by continuing artificial respiration for three or four hours, during which time the poison is eliminated or more probably decomposed and converted into an innocuous substance.

These experiments may be found to be of use in cases of traumatic lockjaw; and it is not unreasonable to predict that patients of that class, whose life is now despaired of, may be saved by introducing oxygen into their organism by means of artificial respiration.

I have not yet had time to visit the Exhibition, where several medals, I have heard, have been awarded to Americans for superiority in manufacturing mineral teeth.

JOHN D'OYLEY EVANS, D D.S.

Answers to Querists.

Properties, Generation and Administration of Nitrous Oxide Gas. Query 2nd.—*Generation of Nitrous Oxide Gas? Answer.*

The apparatus required for the generation, purification and preservation of this gas, consists of a *retort,* a *purifier* or *washer*, and a *receiver* or *gasometer ;* the three being connected by means of rubber tubing.

The *retort* should be of glass, and to prevent its fracture by the heat, necessary to fuse and boil the nitrate of ammonia, it should be protected by a sand bath consisting of a porcelain or metalic cup partly filled with sand into which the base of the bulb of the retort is buried.

There are several kinds of *purifiers* in use. The *purifier* attached to Snowden and Cowman's Gas Generator, consists of two glass jars, similar in arrangement to what is known as Woulf's apparatus, except that they have no central or safety tubes. One of these jars contains a solution of sulphate of iron ; the other a solution of caustic soda or potash, and are so connected by means of the rubber tubing with the retort, in which the gas is generated, and with the receiver or gasometer, that the gas is compelled to pass through the iron and soda solutions, before it can reach the gasometer in which it is stored.

These solutions free the gas from such deleterious agents as chlorine, nitric oxide, hyponitrous acid, &c. Additional care may be taken to free the gas from such agents, by having the gasometer filled with lime water, through which the gas passes in its ascent to the bell of the receiver.

Sprague's *purifier* or washer consists of four glass jars arranged in the same manner as the apparatus just described.

Bean's *purifier* is a cylindrical copper vessel, twelve inches high and five inches in diameter, open at both ends and having a partition of the same material about four inches from the lower end, with a series of holes around the circumference of the cylinder just below this partition.

The upper portion of the cylinder contains several layers of moist lime, separated by intervals, and supported on disks of wire gauze. The whole sits in a vessel of water six inches deep, and is covered with a bell-glass. The pipes are so arranged that the gas passes into the lower portion, bubbling through the holes into the bell-glass, returning downward through the layers of lime, thence through the partition by a pipe leading into the gasometer.

White's *purifier* contains seven inverted glass tumblers which rest upon a perforated metal plate, placed about midway in a vessel. On this plate a number of tubes are soldered, so that two tubes are under each tumbler. The purifier is filled with the required solution a little above the opening of the tubes, and the gas from the retort entering the first tube passes through the second tube into the water contained under the first tumbler; rising to the top of the tumbler it passes into and through another set of tubes contained in the second tumbler, and from thence consecutively under the remaining tumblers, being washed seven times; thence entering by a connecting tube through a pipe (which is provided with a stop-cock,) it passes into the gasometer.

The *gasometer* or *receiver* for nitrous oxide gas is made of sheet zinc, so arranged as to receive and measure the gas, and preserve it over water. The two principal parts are the bell and tank, the bell being suspended in the tank by means of cords passing over pulleys fixed in the top of the frame work, and having weights attached to each side.

The bell is balanced by the weights; and a scale and index attached to the gasometer, registers the quantity of gas generated and also the quantity inhaled by the patient. At the base of the gasometer are two stop-cocks, one of small size to allow the gas from the purifier to enter the gasometer, and the other large, connecting with the tube through which the gas is inhaled, which tube in the interior of the gasometer opens above the level of the water.

(To be continued.)

SELECTED ARTICLES.

ARTICLE V.

Death from Inhalation of Ether.

Hitherto it has been the boast of the advocates of ether that not a single well attested case is on record, of death resulting immediately from its inhalation. Such a case is reported in the Paris *Gazette Hebdomadaire* for May, communicated to the Medical Society of Lyons by M. Laroyenne, in whose hands it occurred. The subject appears to have been a cripple in feeble health. The nature of the operation performed, does not fully appear. We translate the account as its stands, together with the comments, that the reader may attach his own estimate to it.—"Subject, a female aged 48 years, constitution feeble. Has an old affection of the left knee, with distortion of the lower extremities. Anæsthesia practiced with caution, insensibility occurring after the inhalation of ten drachms of ether. In two or three minutes, the breathing became embarrassed, face pale, pulse insensible. The recumbent position and cold affusions roused her from this first syncope. Hardly had she been put in bed—fifteen minutes after the first syncope—when a new attack came on, and notwithstanding artificial respiration, prolonged insufflation, galvanization of the diaphragm and the intercostals, galvanization of the heart by the aid of long acupuncture needles, it was impossible to recall her to life. An attentive examination of the thoracic organs before anesthesia, had failed to demonstrate any organic lesion. The analysis of the ether by Professor Glenard proved that it contained no foreign substance other than three parts in a hundred of water. *Necropsy.* Mucus in the larynx and trachea, pleural adhesions; tubercles in the left pleura; base of left lung congested. The pulmonary tissue was impregnated with the odor of ether. Small quantity of

fluid in the pericardium ; heart normal ; ventricles empty ; auricles gorged with blood ; nervous centers sound, possessing a feeble odor of ether ; a small quantity of fluid in the ventricles. Medulla compressed by a tubercular mass developed in the seventh and eighth dorsal vertebræ, which presented no appearances from without. The alteration had advanced to the left coxo-femoral articulation, which presented tubercular masses and osseous fragments of the capsule ; head of the femur completely detached ; neck totally destroyed. Right hip joint full of blood ; recent fracture of the neck of the femur. This case should be considered as an example of death consecutive to etherization. Among analogous cases in which death has supervened some time after etherization, it has been possible, too often, to raise serious doubts on the nature of the accidents. Here the time which elapsed between anæsthesia and death was too short for the influence of the ether to be discarded. M. Laroyenne has himself passed judgment after the following manner : "Very evidently the ether was not the sole cause of death in the present case. It acted in favoring the syncope to which the patient was already pre-disposed by reason of her state of general debility. Assuredly the syncope would not have been produced had the operation been effected without etherization."

In a subsequent number of the same journal, from which the above is extracted, appears a short account of an interesting discussion in the Medical Society of Lyons, called up by a report of this death from ether. One of the members stated that during the past fourteen years there had been *seven* deaths attributed to ether—this, notwithstanding the former announcement of M. Petrequin, that since chloroform had been discarded and ether substituted some fourteen years ago in Lyons, no deaths following anæsthesia had occurred in the hospitals of that city. It may be added, however, that the seven cases were submitted to the criticism of the members of the Society, and it was

asserted that in almost all of them, the ether had less to do in causing death, than the unfortunate complications existing in the patients. And we may add, that this is in accordance with the received opinion, at least, in America, that death does not occur *immediately* as the consequent of the ether, but *remotely*, and only in those cases where serious complications exist, and which in many instances should contra-indicate its use. The Society adopted a resolution that hereafter all deaths chargeable to ether should be submitted to it, by a Commission, for discussion.—*Pacific Medical and Surgical Journal.*

ARTICLE VI.

A Case of Anaplasty of the Palate.

By E. FRANKLIN COATES, M.D., Mystic Bridge, Conn.

THE operation for the cure of congential cleft palate, though not new, is not very common, for "failure after failure has been the common result, except in some rare instances and most favorable subjects."

The patient, John Tufts, aged 24 years, was born with the *uvula* in two parts, the cleft extending a little more than one inch upward into the *velum palati*. I found on each side of the palatine arch muscular structure enough, so that with forceps the parts could be drawn together; therefore decided to operate. July 12th, '67. I held the uvula of one side and its pillar with forceps, and with angular scissors commenced by cutting the mucuous membrane from its side. I then seized this membrane, holding it (instead of both it and the velum) with the forceps, and with a small scalpel (instead of the blunt pointed bistoury usually recommended,) I was enabled to skin a larger surface of the membrane from the edge than I could have done by holding the muscular structure also. I was careful to hold the edge of the knife towards the velum so as not to

cut away the detached membrane, but leave it entire to the upper part of the slit. When this was done I left the membrane hanging, and then operated on the other side in the same way, cutting up to where I left off on the opposite side, removing the whole membrane of both sides of the opening in one piece.

I then held the velum with forceps, and with a small, rather short, crooked needle, held in bent needle forceps, I took the first suture near the upper part, being careful that the needle did not penetrate the nasal surface, and that the suture passed through the centre of the denuded edge. The hold was broad, being about three-sixteenths of an inch on each side, The suture used was common machine silk. In this way I entered three threads with their ends hanging out at each corner of the mouth. I then inserted the fourth at a suspicious place, so as to be sure and hold the parts together.

I then knotted the sutures in the order of their insertion, but found the common surgeon's knot would slip, therefore made three turns, which answered my purpose better. Now, after the sutures were all tied and their ends cut, in order to give additional security, another broad, deep suture was introduced through the entire velum into the nasal fossa, and brought out through the velum of the opposite side, so as to encircle the cut. This was firmly tied and the operation was complete.

July 15th. Three days after the operation, one suture becoming loosened, was removed, after which, as they became loose, the sutures were removed daily, until July 18th, in six days, the last was removed, and the parts were united together; and now, July 26th, in two weeks, the inflammation has gone, and the parts appear as sound as though nature had formed them in their present position.

After the operation, the patient was directed to live on liquid food, milk, beef tea, etc., and to avoid everything that could in the least irritate the throat.

As the parts to be brought together are extremely thin,

it is necessary that we dissect the mucous membrane in such a manner as to expose as much raw surface as possible. I believe the success of this case depended upon holding the membrane alone in the forceps and the use of the scalpel, with the point of which I was enabled to denude a larger surface than I could have done with any other instrument. By leaving the dissected membrane unbroken from the point of the uvula of one side up and down the entire sides of the triangle to the point of the uvula of the opposite side, I was sure that every part of the cut edge was thoroughly denuded, without which the operation would be fruitless, or but a partial success.

I would not attempt to operate unless the patient could so far control himself as to let me draw the parts together without serious flinching, for the operation is a delicate one, the parts to be brought together, especially at the upper part, being very like the shaved edges of two bits of calf skin, so far as surface is concerned, and not only requires a mechanical eye and dexterous hand, but a determined and obedient patient.—*New York Medical Journal.*

ARTICLE VII.

Use and Abuse of Poultices.

By Dr. Benj. Richardson.

In his lectures recently delivered at the College of Physicians, Dr. Richardson made the following remarks on the subject of poultices:

The application of moist heat in the form of poultice to suppurating parts requires, I think, remodeling, in order that it may be placed on a true scientific basis. I am afraid that the common recommendation, "You must put on a poultice," is too often among us all an easy way of doing something about which we are not quite sure, and concerning which it were too much trouble to think long.

From what I have recently observed, I fear that mischief is often done by a poultice which might well be avoided. The people have always a view, that a poultice is applied to "draw," as they say—a term in truth which, though very unsophisticated, is in a sense a good term, for it means what it says. The question for us is, whether it be sound practice to carry out as a general rule the "drawing" process, either by fomentation or by poultice.

When a part is disposed to suppurate, the first step in the series of changes is an increased flow of blood through the capillary surface, followed by obstruction, and thereupon by an excess of sensible heat derived from the friction that is set up. Then follows transudation of liquor sanguinis into the connective tissue, and its transformation, under the influence of heat, into what is called purulent fluid. When to the part in this state we apply moist heat, we quicken suppuration, mainly by upholding the temperature; and at the same time, we secure the transference of water from the moist surface into the fluids of the inflamed part, by which tension of tissues is produced, and in the end yielding of tissue at the weakest point.

When the suppurating surface is circumscribed, the rapid induction of the process may be attained with little injury; when the surface is large, and when the exuded fluid is thrown into loose structures where it can burrow readily, the practice I think, cannot be good to extend the mischief. Hence, in the treatment of carbuncle and phlegmonous erysipelas, it cannot, I opine, be sound practice in the early stage to apply moist heat. Experience also, not less than principle, warrants this conclusion.

In cases of carbuncle especially, I have of late altogether avoided the application of moist heat in the early stage, I feel assured, with good results.

But when in the course of local disease suppuration is actively established, and is naturally circumscribed; when the increased temperature of the part has fallen to or below the natural temperature—then the value of

moist heat comes on with full force; then the tension which is exerted determines the escape of fluid at the weakest point of the surrounding tissue, and when the fluid escapes or is liberated by the knife, the escape for a long period is aided by the application of moist heat.

The continued application of moist heat for a long time after the escape of purulent fluid is again, I conceive, indifferent practice. It sustains discharge; it sets up unhealthy decomposition of fluids; it produces a thickened, soddened condition of skin, most favorable to the production of sinus; and it retards recovery. When a surface is freely open and suppurating, dry, and not moist heat is the remedy. We are in want in these cases of a simple invention; we require something which we can apply as readily as a poultice, which shall keep up the temperature of the part, and at the same time take up moisture, and gently dessicate without injuring the tissues.—*British Medical Journal.*

MONTHLY SUMMARY.

Chemistry of the Secretions.—Dr. J. H. Salisbury, Professor of Histology, Physiology and Cell Pathology in Charity Hospital Medical College of Cleveland, Ohio, has been making a series of researches, which he has published in the *St. Louis Medical Reporter.* We extract from the paper in that Journal the following summary of results.—(*Eds. Amer. Journal.*)

The following appear to be the main facts elicited from the foregoing experiments, and from some brief concluding remarks relating to other experiments and investigations, which are too extended to be introduced in this paper:

1. The salivary secretions excite the panary fermentation in wheat dough.

2. The salivary secretions excite, also, in moistened wheat dough that has been raised by them, the developement torula (yeast) cells, quite as abundantly and readily as brewers' yeast, and, consequently, must excite in farinaceous matter alcoholic fermentation.

3. The salivary secretions excite the acetous and putrefactive fermentations in wheat dough.

4. The salivary secretions do not excite any perceptible alcoholic fermentation in solutions of sugar, but slowly develope acetous and putrefactive changes.

5. The salivary secretions hasten putrefactive fermentation in fresh meats.

6. Torula cells have been noticed in the blood of the living body, indicating the presence of sugar, undergoing fermentative changes.

7. Algoid and fungoid spores occur in the blood of fevers, in that of erysipelatous inflammations, and in that of diabetes.

8. The cell products of parent cells have a tendency to take on filamentous developement, and those filaments make up much of the basement structure of the animal body.

9. It appears that one important office of the lymphatics is, to more perfectly assimilate, transform and organize albuminous matters into fibrine, and that they are not exciting organs, but strictly organs of assimilation.

10. Cholesterine occurs in the vitreous and aqueous humors and crystalline lens of the eye.

11. Seroline occurs as a secretion in, and an excretion of, the prostate gland.

12. Certain forms of the lithates of ammonia and soda of Golding Bird are deposited in developing cells that emanate from the epithelial tissue of the urinary surfaces.

13. Cholesterine and seroline are formed quite largely by the spleen. This organ appears to be one of the principle sources of the cholesterine and seroline that are formed in the animal body.

14. The pancreas, in the hog, appears to possess the power of transforming cholesterine into seroline.

15. The thyroid gland of the hog contains seroline.

16. Peyer's glandulæ and the mucous follicles of the large intestines, and the lower portion of the small intestines, eliminate seroline, mixed with cholesterine in the last stages of transformation into seroline.

17. The cholesterine, secreted from the blood by the liver and poured into the alimentary canal as a constituent of the bile,

appears not to be an excretion proper of that organ, as is evident from the fact that it is mingled with the chyme (as a constituent of the bile) and aids in transforming this substance into chyle, with which it is taken up by the lacteal system, and, during the elaboration of the nutrient materials in their passage through the lacteal glands, becomes partially transformed into seroline. This renders it probable that cholesterine, with other products of the bile, perform some useful function in the assimilation and *organization of the nutrient materials.*

18. Cholesterine is not eliminated from the body as such to any great extent, but is transformed usually first into seroline, before it *becomes an effete product.*

19. Cholesterine is taken up with albuminous matter from the blood in its capillary circulation by the lymphatics, and, during its passage through the lymphatic glands, appears to become partially transformed in seroline.

20. The Cholesterine of the food of the bile appears to be partially transformed into seroline by the lacteal glands. These glands also appear to have the power, to some extent, of forming cholesterine in the process of organizing fibrin cells from the albuminous materials of the chyle.

21. Epithelial cells are extra-vascular, and appear to be organisms analogous to cells of the zoosporoid type, possessing a vitality independent of the animal to which they are attached, and placed between the dead world and the living animal tissues; their function being to feed upon crude matters, and so change their character in their transit through them as to fit them to act as food for the more highly animalized parent cells inside the basement membrane.

22. That the epithelial cells covering the intestinal villi appear to be the primary agents in the taking up and organization of the chylous materials of the food; that they fit a portion of the materials transmitted through them to be appropriated by the capillary vessels; while the balance passes on to be taken up by the lacteals, and to be organized by the parent cells of the lacteal glands.

23. That much of what is called endosmotic and exosmotic action appears to arise primarily from the vitality of living cells; and, as such is not a property of dead matter, but one of

living cells, by which living cell organisms are fed and nourished. It is simply a process of cell-feeding.

24. That the important and primary function of the lacteal and lymphatic glands is to organize fibrin cells; from which, by metamorphic changes, a portion of filamentous fibrin and blood discs of the blood are formed; also, a portion of the nerve products, including cholesterine and seroline.

25. That the important function of the spleen is to organize fibrin, blood discs, and cholesterine and seroline, and some other nerve products.

26. That it is the primary function of the lobules of the liver to organize fibrin cells and animal glucose; and that of the interlobular cells and biliary glandules to form the biliary secretions.

27. The biliary glandules terminate the biliary tubuli in the interlobular spaces.

28. A primary function of the kidneys and supra-renal capsules is to form fatty substance, and perhaps bony matters, and a peculiar class of fibrin cells, resembling somewhat those of the liver; and that the secretion of urine appears to be a resultant process of the organization of these products.

29. *That the primary form of fibrin, when first organized from albuminous matters by the parent cells of the glands, is a cell* enclosing (in mammalia) a large central nucleus, surrounded by many minute cells. That, subsequently, this cell, save its cell contents, is "spun" or metamorphosed into a filament, which filament is a secondary form of fibrin, the form of blood fibrin, and in which condition it is fitted to permeate the thin-walled capillaries, and be appropriated by the living fibrinous tissues.

CONCLUDING REMARKS.

Cholesterine and seroline are formed quite largely in the spleen during the organization of cells (fibrin cells and blood discs) in this organ. The cell products of the spleen have been treated of fully in a paper on this subject, published in the American Journal of Medical Sciences, April, 1866. The ultimate structure and functions of this gland are highly interesting, and explain many obscure and long sought for physiological processes. There is strong evidence for believing that this gland instead of the brain, as has been supposed, is one of the principal

sources of the cholesterine that originates in the animal body. Unless the brain be admitted to be in part a gland, we ought to have suspected that it necessarily could have itself no power to organize the ultimate products of which it is composed. It is the peculiar function of glandular structures in their varied arrangement to organize the ultimate basement products of which the tissues of the body are built up and sustained. The tissues, save the fibrinous, cartilaginous and bony, have simply the power of appropriating materials organized for them by glandular structures. There is, however, some probability, from the presence in the nervous system of nucleated cells, which appear analogous to parent gland cells, that it may perform glandular functions, but of what extent is not known.

There is also evidence for believing that the lacteal and lymphatic glands form cholesterine and seroline to some considerable extent during the performance of their function of organizing fibrin cells, &c., from the albuminous materials of the chyle. There is also evidence of these glands performing the office of transforming, in some degree, the cholesterine of the chyle (nutrient products of the food mixed with bile) into seroline.

Further, there is evidence that the bile is a product of the interlobular, epithelial cells, from which it is secreted by *biliary glandulæ*, which are found to terminate the biliary tubuli in the interlobular spaces. It appears, although an excretion of a certain class of hepatic cells, not to be an excretion proper of the liver, but a secretion, secreted by the biliary glandulæ for specific purposes in digestion and assimilation. The evidences of this will be fully set forth in another paper on the ultimate structure and functions of the liver.

Absorption of Medicines.—The Southern Journal of the Medical Sciences, for August, contains a translation of a paper by M. Demarquay on this interesting subject, of the general results of which we make a brief abstract.

We all know that absorption from the gastro-intestinal surface is constantly relied on, but the rate at which that absorption goes on, and its relative activity, as compared with other mucous, serous and dermal surfaces, has not been carefully and scien-

tifically studied. Mr. Demarquay has attempted to supply this deficiency. The substance he selected was iodide of potassium, on account of its known rapidity of absorption and facility of recognition. The secretions in which evidences of absorption were sought, were the urine and the saliva. Sometimes the one and sometimes the other of these secretions manifested the presence of the medicines with greater rapidity. As a general thing, evidences of the presence of the salt can be obtained from these secretions in from 9 to 15 minutes after its introduction into the stomach.

Different opinions have been entertained by practical men as to the relative rapidity of absorption by the upper and lower tracts of the intestinal canal. It has been customary, for example, to give much larger doses of medicinal agents by the rectum than by the mouth. Dupuytren, however, maintained that absorption of opium was more rapid in the rectum than in the stomach. The experiments of our author confirm the opinion of the great surgeon. He obtained evidence of the presence of iodine in the blood, from 2 to 7 minutes after the introduction of iodide of potassium into the rectum as an enema.

The mucous membrane of the bladder absorbs feebly. The time required to detect iodine in the saliva after the injection of a large quantity of iodide of potassium into the bladder, varied from 35 minutes to 6 hours. In one half of the observations none whatever was recognized.

The mucous membrane of the glans and prepuce in the male and of the vagina in the female, absorb but feebly in the natural state; when diseased, however, ulcerated or abraded, absorption in these regions is very rapid.

The bronchial mucous membrane is very prompt and rapid as an absorbing surface. When iodide of potassium is inhaled in the form of spray from an atomizer, it makes its appearance in the urine in 5 or 6 minutes.

Serous membranes absorb readily. Injections into the tunica vaginalis of the testicle, passed into the circulation, in times varying from 7 to 38 minutes.

The question of absorption by the skin is rather more intricate. It is well known that when the surface is painted with tincture of iodine, the urine speedily gives indications of the presence of

iodine. Unfortunately, however, for the hypothesis of cutaneous absorption, the surgeon and the bystanders are found to have iodine in their urine also. The absorption has taken place not through the skin but through the mucous membrane of the air passages. Experiments with baths gave our author usually negative results. Out of sixteen baths containing a large quantity of iodide of potassium, (nearly a quarter of a pound in most of them) no evidence of absorption was discoverable in ten. In eight a feeble indication of iodine was found in the urine. The author thinks these even doubtful as proving absorption from the general cutaneous surface, as the genito-urinary mucous membrane might have been credited with the result. To determine more accurately the activity of the skin, he resorted to inunction. An unguent made of pure lard and iodide of potassium was applied to the leg and thigh of a patient, which was then carefully enveloped with gum taffeta, wadding and bandages. In twenty experiments of this kind, a small quantity of the salt was detected in the urine. Dry iodide is never absorbed.

Perhaps the author was not sufficiently persistent in his use of the iodide in baths. Hoffmann took every third day, for six weeks, a bath containing 770 grains of iodide potassium. After the fifth bath only did that distinguished chemist recognize the presence of the iodide in his urine. It is remarkable that elimination in this case was as slow as absorption, since the salt could be detected in the urine twelve days after the baths had been discontinued.

Mixed Chloroform and Ether.—Robert Ellis, in a communication to the London Medical Times and Gazette, points out several objections to the common practice of mixing these two anæsthetics.

First—The ingredients of these mixtures evaporate to a great extent independently of each other and in very different quantities.

Second—That though alcohol exerts *in vacuo* a powerful influence in equalizing evaporation, this influence is almost lost in evaporation in free air.

Third—To procure a true anæsthetic mixture, due attention must be paid to the relative volatility of the ingredients, which must be mixed in such proportions as to insure their simultaneous evaporation.

Fourth—The quantity of ether required to insure this result is so great that the mixture becomes equivalent to ether alone.

Fifth—If impure alcohol and ether be used, these defects are exaggerated and the result is vitiated by the water left behind after evaporation.

A mixture of one part of chloroform and two of ether, commonly employed in England, was experimented upon. Half a drachm was poured over a definite evaporating surface, and in a hundred seconds nearly all the ether had evaporated. For three minutes the evaporation of chloroform went on, and in four minutes all had gone, only a faint odour of alcohol remaining.

The same mixture was distilled at a gentle heat, not exceeding 120°. Before distillation, its specific gravity was 990. At the end of half an hour, the distillate had a specific gravity of 910. At the same time the density of the residue in the retort was 1120, showing that the ether had evaporated much more rapidly than the chloroform. Thus the ether, which is relied upon to stimulate and so counteract the depressing action of the chloroform, is used up at the beginning, and the latter anæsthetic is left to itself, at the most critical period of the anæsthesia.

As a substitute for this dangerous and untrustworthy compound, Mr. Ellis reccommends the use of the "mixed vapours." He has contrived an apparatus by which the three different vapours can be inhaled either separately, or combined, in such proportions as the operator may choose.

Ozone.—The Rev. Samuel Haughten, M.D., F.R.S. has been writing on the meterogical causes of Asiatic Cholera. In these papers he attacks the notion so long prevalent that ozone destroys the cholera poison. He maintains, first, that ozone is a constant or nearly constant quantity in the atmosphere, and that the different tints of the test papers are due to the greater or less prevalence of winds which bring unequal quantities of air to act upon the iodide. He cites, in proof of this, the experiments of Mr. Smyth, who placed ozone in a tube connected with an aspiratur, thus securing a regular flow of air. He found that the tint was the same every day, while exposed papers were subject to the greatest variations in colour. The curves of the anemometer were also found to correspond closely with those of

the ozonometer. Secondly, he claims that there is no demonstrable proportion between cholera and ozone. The curves of the two certainly show no correspondence; on the contrary, the very day that the cholera was most fatal, ozone was in greatest abundance.

BIBLIOGRAPHICAL NOTICE.

Harris' Dictionary of Dental Surgery. Third Edition, Revised and Enlarged, by Ferdinand J. S. Gorgas. M.D., D.D.S., Professor of Dental Surgery in the Baltimore College.

We have received from those well known publishers of Medical, Dental and Scientific books, Messrs Lindsay and Blakiston of Philadelphia, a copy of this work, the mechanical execution of which far excels that of the former editions. By subjecting the work to a careful revision, the editor has endeavored to bring it up to the present state of the Science, and make it worthy the attention of the profession. About three thousand new terms have been added, and additions and corrections made to the definitions of many others.

Among the great number of important additions are the doses of the more prominent medicinal agents; a table of the muscles arranged according to their actions; and the different classes of poisons with their antidotes. Many of the old formulæ, which are now obsolete, have been omitted, together with descriptions of the treatment of diseases of the dental organs, where the same appears in the author's Principles and Practice of Dental Surgery.

EDITORIAL DEPARTMENT.

The Code of Dental Ethics.—We find in the September No. of the *Dental Register* the following notice:

"During the Exhibition of Instruments and Appliances at the meeting of the American Dental Association, held in Cincinnati a few days ago an Automatic Plugging Instrument passed in an illegitimate way from us to the possession of some other person. That person is known, and if he wishes to avoid any further publicity of the matter, he will return the instrument at once, and nothing more will be said about it. If it does not come home we will take measures to bring it home. We don't like that style of borrowing."

Several other articles on exhibition, besides the one referred to in the notice, we also learn, "passed in an illegitimate way" from their owners to some other persons; and yet this Association at its late meeting re-

fused to adopt the *Code of Dental Ethics*, prepared by a committee appointed for the purpose, at the Boston meeting in 1866. Earnest efforts were in vain made by several influential members at the late meeting, to have this or some other code adopted, which would guard against the admission of unworthy members.

Such acts as we refer to will, we think, convince the most skeptical of the necessity existing for the adoption of stringent rules governing the admission of members and delegates. Article II. of the rejected Code refers to the maintaining of professional character, and reads as follows:

Sec. 1. A member of the dental profession is bound to maintain its honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors; the aged special encouragement to their juniors.

Sec. 2. The person and office arrangements of the dentist should indicate that he is a gentleman; and he should sustain a high-toned moral character.

Sec. 3. It is unprofessional to resort to public advertisements, cards, handbills, posters, or signs calling attention to peculiar styles of work, lowness of prices, special modes of operating; or to claim superiority over neighboring practitioners; to publish reports of cases or certificates in the public prints; to go from house to house to solicit or perform operations; to circulate or recommend nostrums; or to perform any other similar acts.

Sec. 4. When consulted by the patient of another practitioner, the dentist should guard against inquiries or hints disparaging to the family dentist, or calculated to weaken the patient's confidence in him; and if the interests of the patient will not be endangered thereby, the case should be temporarily treated, and referred back to the family dentist.

Sec. 5. When general rules shall have been adopted by members of the profession practicing in the same localities in relation to fees, it is unprofessional and dishonorable to depart from those rules, except when variation of circumstances requires it. And it is ever to be regarded as unprofessional to warrant operations or work, as an inducement to patronage.

New Appliance.—Dr. Henry Clark of this city has recently invented and brought to our notice a simple appliance, to be used in connection with the Inhaler, by which the administration of Nitrous Oxide Gas is greatly facilitated. It consists of a small square bag made of sheet rubber, capable of being partially inflated with air, and thereby forming a cushion which, by pressure with the fingers, is readily adapted to the surface of the face about the nose and mouth,

It is attached to the nozzle of the inhaler in the same manner as the simple sheet or disk of rubber cloth—by means of a hole near to the

centre, through which the mouth-piece passes—and is pressed about the mouth and nostrils by two of the fingers of the left hand, while the other fingers of the same hand support the inhaling tube.

It is very simple and yet very serviceable.

Consanguineous Marriages.—We would call attention to the following, and trust it will be responded to by such of our readers as can furnish the required information:

At a late meeting of the "Medical Society of the State of New York," it was resolved, "that a committee be appointed to investigate and report upon the result of consanguineous marriages, &c.," if such marriages come under the observation of the members of the profession, they will confer a favor by answering the following questions, and transmitting such report before November next, to the undersigned, one of the committee appointed:

1. Name (initials) and age of husbands.
2. Nativity.
3. Age when married.
4. Constitution.
5. Health, deformities, peculiar diathesis.
6. Health of his family, hereditary diseases, deformities, &c.
7. Name (initials) and age of wife.
8. Nativity.
9. Age when married.
10. Constitution.
11. Health, deformities, peculiar diathesis.
12. Health of her family, hereditary diseases, deformities, &c.
13. How are the parties related to each other?
14. How long married?
15. How many childern, or sterility?
16. Abortions; cause; how many, and at what period?
17. Children died, at what ages and from what diseases?
18. The constitution, age, and present health of living children, deformities, mental conditions, idiocy, cretenism, deaf, mute, blind, epilepsy, albinism, insane, &c.
19. Remarks and other information.

Address, ROBERT NEWMAN, M.D.,
118 W. Houston Street, New York.

Morgan's Plastic Gold.—The success which has attended our use of this new form of gold for filling teeth, and the favorable opinions expressed concerning it by excellent operators, warrants us in recommending it to our readers for trial. The following directions are given for its use.

"This preparation is to be manipulated with instruments of shallow serration, and requires some little practice to become familiar with its work-

ing properties. It may be used in quite large pieces without fear of leaving a porous sub-surface from superficial consolidation. Although very *cohesive*, care must be exercised in first carrying it into the cavity to work the material *gently* together, after which it may be forcibly condensed, subsequently admitting of pressure with the finest points without danger of cutting or flaking the surface, which equals in density and toughness the finest foil."

Dr. Colburn's New Base for Artificial Teeth.—This material, of which a notice was given in the September No. of the Journal, is of the nature of a cement—being composed mostly of mineral substances, and containing none of the elements of Rubber or Gutta Percha. Asbestos appears to be an important ingredient, and it is said to possess "remarkable toughness, adherence, strength and lightness." The specimen we have seen, a full upper set of teeth, was composed of this cement attached to an aluminum plate, and presented a very fine appearance. Of its durability we know nothing, but Dr. Colburn in his circular refers to the certificates of responsible persons who have satisfactorily worn for several months, sets of teeth mounted upon this base. He also asserts that "single teeth or blocks can readily be mounted upon a plate of aluminum by means of this material, as they could be attached to gold or platina." "The teeth are arranged as for Rubber work, the plate struck up, its surface well roughened and placed in the flask; no backing or soldering being required." It is also asserted that the fluids of the mouth have had no effect upon it, and that in some mouths, the polish instead of being removed by wearing, is increased.

We present the above statement to our readers in order that they may be able to form some idea of this new material, and what is claimed for it.

Dental Medicine—We are much indebted to Dr. S. S. White for some very fine preparations prepared especially for the dental profession. They consist of Dr. Benj. Richardson's Styptic Colloid, a notice of which appeared in the July No. of the *Am. Journal of Dental Science;* also compounds of Carbolic acid and Glycerin, and of Iodine and Glycerin.

The two last preparations we have for a long time, been successfully using for fetid discharges and cases of chronic abscess.

We have also received from Dr. White an illustrated Dental Catalogue, the finest work of the kind ever issued.

Apology.—Some apology is due our readers for a number of typographical errors in the July and August numbers of the Journal. These errors resulted from our not having an opportunity to correct the proof sheets, owing to absence from home during the hot weather.

NOVEMBER, 1867.

THE AMERICAN JOURNAL OF DENTAL SCIENCE.

EDITED BY

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AND

F. J. S. GORGAS, M.D., D.D.S.

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THE

AMERICAN JOURNAL

OF

DENTAL SCIENCE.

Vol. I. THIRD SERIES—NOVEMBER, 1867. No. 7.

ORIGINAL COMMUNICATIONS.

ARTICLE I.

Essential Nature of Caries. No. 3.

(Continued.)

By H. R. NOEL, M.D., Professor of Physiology,
Baltimore College of Dental Surgery.

A PERTINENT inquiry suggests itself at once. Does the disease advance now, from the direction of the pulp, and attack the inner surface of these lines of consolidation; or does it advance from without inwardly, and therefore directly through this "zone of consolidation," through this new, and now solid line of dentine just formed? Does it go on towards the pulp, and having removed "the zone" again assail both fibrils and dentine? The quotation from Mr. Tomes answers the question, but practical experience answers it and asserts that the disease advances now as always from exterior to interior, for if otherwise, then would filling be indeed an absurd precaution.

Another fact of importance is this, that in the consolidation of the tubes or rather calcification of the fibrils; in the formation of this "zone of consolidation," this breastwork thrown up for defence, nature has emphatically with-

drawn her *vital forces* from the *front* and concentrated *behind this zone.* And significant indeed is this withdrawal.

The nuclei are dead, calcified; the "germinal material" calcified, the whole fibril calcified to the extent of the breadth of this barrier, breastwork or zone, and therefore as incapable of exhibiting vital phenomena *as a piece of iron wire* of the *same length.* But strange to say we are here barricaded out from the only elements of the tooth that are really vitalized; the disease and cause are left outside of this barricade, and the tide of vitality has receded leaving physical forces alone at work. The cause or power operating is an external one here, and the process a purely physical one until the zone is removed, and the fibrils again reached.

Ergo—and we defy any escape from the conclusion, ergo—caries in this case has no element whatever of vitality and is a purely physical or chemical affair. And what is worse still for the vital theory, this is not the exception, but *the rule.* Nature's rule is to barricade out both cause and effect—both agent and disease; both are external and abhorrent to her, and she resists by a systematic barricading.

In fact in many instances, successive lines of these barricades, "zones of consolidation" mark the struggle and mark her retreat to the pulp; taking with her every element of vitality to this the last fortress.

Mr Tomes thinks the *death of the dentine* to be the necessary *prerequisite* to caries; being dead it is acted upon by the cause—but *resists while alive.* This is an assumption of the purest kind—utterly unsupported by one single fact, and in direct opposition to the very phenomena of decay as described by himself. The only vital element that we have so far found as belonging to, or rather as being often present in caries, is the effort by which the zone is produced, and this, strange, very strange to say, is conservative, protective, preventative, and *yet* consists in killing, absolutely and emphatically killing the fibrils to form a barricade against the enemy.

Nature calcifies the nuclei, calcifies the "germinal material," kills the portion of fibril for self-preservation; the death of the dentine therefore, in this case, is the effort of nature to preserve the tooth.

3. Conduction of Sensation by Fibrils.

This is an absolute fact, and the explanation of it is purely conjectural, and has no very practical bearing upon the "Essential Nature of Caries," yet we will give it a thorough investigation.

That the peripheral ends of the fibrils, when exposed and irritated by the air and fluids of the mouth, become very sensitive is a fact familiar to all dentists. That there must be some means of connection between the peripheral end and nerves of the pulp is equally certain; that it can only be along and through the fibril is a necessary and inevitable result of the situation. How the fibrils conduct or transmit sensation, is a matter of no moment to us, the practical fact that they do, is the same; and they are as much isolated as the axis cylinder of any nerve tubule is, as the fibril is surrounded by bony structure. And we believe there is free and uninterrupted passage from the dentinal superficies, along the fibrils to the pulp and its nerves.

We have never accepted the usual explanation given by physiologists, of the terminal distribution of nerve fibres, as it is totally inadequate to explain their varied phenomena. We believe in this *special case*, the nerve fibre by its axis cylinder is continued on in organic continuity with the dentine fibril, losing its distinct individuality as an axis cylinder and blending with the fibril, but retaining in this position, or rather imparting to the fibril, some of its own powers, i. e. reception and transmission of impressions. As a fibril it has the same isolation it possessed as an axis cylinder, and the practical fact, theorize as we may about it, remains; the fibrils are capable of reception and conduction of sensations and impressions. We might say that conduction alone, requirès isolation and retention of distinct individual-

ity as an axis cylinder, but that the reception of impressions &c., at the peripheral ends was facilitated by a blending or fusion of the axis cylinder with tissues, surrounding—this fusion one of organic continuity.

The objection might be raised here, that in caries, there is often extreme sensitiveness, and therefore vital phenomena exhibited, hence the fibrils enter again into the discussion. This we candidly acknowledge, and readily explain ; if the zone of consolidation be not complete ; if it be imperfect, &c., we shall of course have sensitiveness ; and the organic changes going on in the fibril after cutting or injuring it, may give rise to extreme sensitiveness ; other agents may do the same, such as action of air, fluids of the mouth, &c. But once this zone thoroughly completed and all sensitiveness disappears, but the disease and cause are still external and may or may not be active. The sensitiveness proves nothing therefore, as regards the "Essential nature of Caries," it only proves that one or more fibrils are involved in this special case. And here in opposition to Mr. Tomes, we assert that pain is not a very common element in decay primarily, and by no means an essential element. When present it is only incidental, and has no practical bearing upon the nature of decay.

Caries in enamel is never marked by pain, and carious cavities may exist in dentine and often do, without occasioning the least inconvenience. We examined carefully the mouths and teeth of ten persons, who asserted that their teeth were perfectly sound, had never been painful or even sensitive ; eight of this number had carious teeth, and some three or four had very decided cavities. Pain therefore is not an essential element of caries, and we exclude it.

We have given and we think, fairly given the whole of the vital phenomena of the fibrils, the whole of their vital endowments ; we have discussed them at some length, but have failed to find any vital element, invariably present in caries ; not one, enters as an essential. Eliminating

step by step, the incidental elements present in different cases of caries, we have arrived at last, at that point, whence the essential elements, the ever present, the invariable, rise to their true position—and their true significance is appreciated.

That no mistake may occur, we repeat that as caries can and does occur, without any vital element entering into the process, it cannot be claimed that caries involves other than physical forces.

It is intrinsically other than a vital process. We refer of course to caries of teeth, and not of bone. We believe caries of teeth to be an affection "SUI GENERIS."

We have examined various writers upon caries of bone, and we have *carefully examined* them, and we have utterly failed to establish the analogy between the two; it is often assumed, but no where have we found it substantiated by proof.

Dr. Beale, perhaps one of the best microscopic anatomists alive, has advanced novel ideas as regards caries of bone, but upon caries of teeth he advances no theory, and we are left with a few vague and general surmises. As regards bone—his theory, is to say the least of it, fanciful in the extreme, and cannot for one moment be applied to caries of teeth.

"In caries, the germinal matter (nuclei and nucleoli) of a part of a bone, receives too large a supply of nutrient matter, it grows too fast, and lives upon the surrounding tissue which has been already formed." --*Structure, Growth, and Life. p.* 145.

Here a nutrient fluid is acknowledged to permeate the tissue and caries is described as an affection of the nuclei or germinal centres, and not of the ossified tissue, involving the latter only secondarily. Now hear Dr. Beale upon teeth.

"In dentine, tubes or canals containing air, have resulted from the drying up of the soft matter which occupied them during life, and to these *artificial* channels the office of transmitting nutrient fluid to every part of the tissue has been assigned, but, as it seems to me, upon most insufficient grounds."—*Idem p.* 147.

"There is no evidence of addition and removal of material going on in the enamel and dentine after the completion of their formation, and it is probable, that the matter upon which the hardness of these tissues depends, is not removed at all after its deposition."—*Idem p.* 149.

We make no comment here, as it would be supererogation, in fact it would be "an attempt to paint the lily."

Mr. Tomes is a warm advocate of the "Vital Theory," and he supports his position by arguments from analogy; changes occurring in bone, in skin, in mucous membranes, in the soft structures generally; ulcerations, abscesses, &c., are all brought in, Now we have but little to say of this manner of arguing, but that little is strong; 1st. His arguments are weak. 2nd. They are not legitimate. 3rd. They are anything else than conclusive. 4th. By neither arguments or theory can he explain, the very phenomena of decay, which he himself so ably describes. Practical observation forced Mr. Tomes to the wildest theorizing to support his pet theory.

The phenomena in the case of the soft structures and the phenomena in the case of the teeth are so widely different, the structures so different, the amount of vitality so different, that all arguments by analogy from such sources are worthless—perfectly so.

The *assumption* of the death of the dentine before it can be decomposed, involves also the *assumption* of its vitality; now we have given this point an elaborate and we think, a sufficient discussion, as regards both enamel and dentine; and we unhesitatingly assert that the whole vital theory of caries is founded upon the assumption of an amount of vitality in enamel and dentine, that neither practical experience, nor the latest physiological researches of Dr. Beale, &c., in any sort of manner justify.

Neither physiology nor practical experience sustain the vital theory. Even Dr. Beale, though evidently inclined to gravitate into the vital theory, is unable to do so, having by direct microscopic observation and logical theorizing, hermetically sealed himself outside of the vital, as regards teeth.

One more statement by Mr. Tomes and we shall conclude our article.

(Dental Surgery page 373) Speaking of carious cavities containing an acid, he remarks that if *unresisted* by the *vitality* of the *dentine*, it is capable of decomposing it—i. e. causing caries to extend.

Now this is a most unfortunate and unwarrantable assertion, for the "zone of consolidation" so admirably described by himself, has put a barrier between the vitalized fibrils and the acid, and the acid acts first upon this zone, and this zone according to his own statements, is *protective, restrictive, conservative*, as regards the caries; though as we have most certainly shown, is not *a vitalized structure*, and if perfect consolidation has taken place, no where in the limits of this zone are any vital phenomena whatever possible.

The degree and completeness of consolidation marks two things. (1)—Loss of vitality absolute. (2)—increased power of resistance. This is unquestionably true, but in direct and emphatic opposition to Mr. Tomes' statement.

Now there are certain facts—certain conclusions; certain propositions which we shall place before our readers, and which must inevitably weigh against the vital theory.

I.—The invariably external existence of the cause. Bone, &c., have diseases from internal or vital causes.

II.—Prior to *eruption*, caries never occurs—Mr. Tomes' arguments by analogy from bone are therefore fallacious.

III.—If caries be a vital process—filling teeth as Dr. Arthur ably argues, should increase the predisposition to it, as *dentine* is *more injured and its vitality of course lowered.*

IV. Death of the pulp does not necessitate caries at once, though the *dentine is now surely dead*, and filling of the pulp cavity does not increase the tendency to caries, or modify it in any manner, except as regards pain and the "zone," of course both of them are absent.

V.—Dry and dead teeth, placed in as artificial substi-

tutes, undergo a well defined and characteristic caries, yet here vital agency is of course impossible.

VI.—Decay never *begins* in the dentine, unless the enamel being defective, inadequate protection is offered. Accurately covered by enamel, dentine *never decays.*

VII.—Decay never returns in an accurately and well filled cavity, if all the surrounding tissue be intact. This question is ably discussed in the American Journal of Dental Science, Oct. No., 1851, Article I. by R. Arthur.

VIII.—Cementum is never attacked first, unless the neck of the tooth be denuded.

IX.—Filing teeth, which theoretically and practically removes the enamel, removes a portion of the dentine, tears and lacerates the fibrils, and of course irritates and lowers their vitality, does not intrinsically increase the predisposition to decay, on account of any *injury* done the *dentine.*

X.—On the contrary—practical experience, substantiated by statistical data, demonstrates the fact, that filing the teeth apart and keeping them permanently separated is the true

PROPHYLAXIS.

XI.—That after filing, the first effort of nature is the "zone of consolidation," which is nothing more or less than a calcifying of the fibrils, and a condensation and change of a vitalized into a non-vitalized substance.

XII.—That rapid decay is marked by extreme sensitiveness, pain, &c., which are certainly very inferior proofs of death, but positive evidences of organic change progressing in the fibrils, the only vital element of dentine.

XIII.—That enamel,—that dentine without fibrils,—and the zone of consolidation are non-vitalized structures in the true sense of the word "vitalized," and as decay occurs in these structures, the conclusion is inevitable,

and the inexorable, logical deduction remains to us. "That in its essential nature caries has no element of vitality."

We are well aware, that the conclusion arrived at is opposed to the views of eminent men both in America and England, yet we do not for one instant hesitate to assert, that they must either ignore the latest researches in physiology or discard their theory. The issue is made—and Dr. Beale has, unintentionally it is true, but none the less ably, demolished the foundation of the vital theory. *Non-vitalized* structures cannot have *vital diseases.*

The objection to filing, so warmly urged by the vital theorists, as being injurious to the vitality of dentine and therefore predisposing to decay, has no foundation either in fact or theory. Neither the *practical results* of filing, nor scientific physiology sustain for one instant the objection.

Before the touch of rigid analysis, and the light of practical experience, their theory and practice alike fall.

Filing does not by any injury to dentine, predispose to decay; it may incidentally, give dentine instead of dense, firm, compact enamel, to the action of the agent—and dentine is more readily eroded.

But even here we are met and silenced by practical experience, supported by physiology and dental pathology, for the "zone of consolidation" compensates and presents a surface, which is practically as good as enamel.

The destroying agent is external; the process not a vital one but physical or chemical; teeth by approximating, retain the agent longer and more closely in contact than would otherwise occur, hence the rapidity and extent of its action upon approximating surfaces. We therefore conclude that open spaces are indicated, and filing and cutting away portions of dentine as well as enamel; i. e. effecting a permanent separation receives the sanction of sound physiology, as it has that of practical observation.

The denial of vitality, to dentine and enamel, the zone of consolidation following the file, give us the physiological solution of the results of practical experience. Dr. Arthur gave us the *statistical facts*, we have endeavored to give their solution by physiology.

ARTICLE II.

What constitutes the Respiratory Changes?

By Rufus King Browne, M. D., Prof. of Physiology and Mic. Anat.: N. Y. College of Dentistry.

[I do not claim in the ensuing description, to present a demonstration of the tissue changes, which I believe regularly take place during the respiratory movement, nor to place beyond doubt the effect which these changes have in inducing the insemination of oxygen into the vascular flow, but to fix attention upon the until now unnoticed existence of the facts I state: and thus to anticipate a further account of experiments, which tend to show the correctness of my belief, or if fully successful to furnish an experimental demonstration of them, as facts in physiology.]

Of the two sets of physical phenomena, which are cited to account for the passage of the oxygen into the blood, neither are satisfactory; for it cannot fail to occur on a moment's reflection, in the mind of the competent physiologist, that the phenomena to be accounted for, do not take place in obedience to the law under which the two former sets of phenomena, supposed to be of identical nature, *do* take place.

Thus, the phenomena of endosmose, and exosmose, in which two fluids of different characters or constitutions, as menstrua at first separated by a septum, or solid partition, diffuse on both its sides, and come together, after previous separation, and the phenomena of the mutual diffusion of different gases, similarly once separated, are not phe-

nomena of the same character, as those which occur in the passage of oxygen into the blood. This latter phenomenon, is one which does not take place, either in the diffusion of gases, or in the osmose or exmose of fluids. True, two of the *component* substances of the transaction, in either case, are similar *substances*, but in fact, the *process* performed on the one hand by the carbonic acid in the blood, and on the other by the oxygen, is *neither* a mutual transfusion of at first separated fluids, nor a mutual diffusion of two at first parted gases. The process, in the first case is really one in which a proportion of one of the two constituents of the air—its oxygen, *separates* from its other constituent, and penetrates to a thick liquid and soft-solid constituent, on the one hand, while a heavy gas *separates* from the same liquid, and penetrates into the remaining disproportionate constituents of the air, from which the oxygen came. The phenomena of osmose are not involved in this process at all, nor are phenomena at all identical with those of the diffusion of gases involved ; and no event *similar* to such gaseous diffusion takes place until after the process of *separating* of a gas from a fluid, and its mingling with a second gaseous substance occurs,—and this transaction is one which occurs, not as that we have to account for does, between the blood, and the gaseous volume, but within the lung cavities, where the two are brought into actual contact, and hence mingle. Than this latter transaction, although it involves two of the substances, involved in the other, nothing could be really more *unlike* the respiratory process. For this process is one, briefly, in which a gas naturally in combination with a certain quality of blood, leaves its medium of transport, and *separates* from it, while a portion of a certain volume of gas leaves and separates from its natural combinations with another, each of which takes its respective place and combines separately; in the first case, and on the one hand, effecting, not a diffusion or transient uniting of two *separated* gases, but a *separation*

of one gas from a fluid and the separation of a portion of a second gas, and its immediate uniting with a fluid.

The respiratory process, therefore, is not a mingling of gases, coming together through certain means of separation, namely, a septum, or partition, neither is it a process which in itself occurs in passive fulfilment of any "law" of diffusion of gases. The process is *not* one in which a measure of two gases *diffuse*, and thus constitute a mutual *fusion* throughout the bounds of their respective volumes, equally on either side their dividing line or partition of substance; in short, the process of respiration is one for the *separation* of gas from a fluid, and one gas in part from another, and hence it is not a *diffusion* of gases, and can be neither explained nor understood by a perception of that law. Of course in drawing this distinction;—in showing how widely unlike the two sets of phenomena are, we do not dispute the prevalence of the law of diffusion, but on the contrary, unreservedly accredit and admit it, but we show, that the phenomena themselves, are widely different. The gas which separates from the blood, subsequently of course, diffuses with the combined gases of the air in the lung cavities, *in accord* with that law, and would do so if there were septa put between, across the calibre of the lung cavities at the level where they commence to mingle. But this mingling is always consequent upon prior fulfillment of the respiratory process, which consists in the penetration to the blood of the oxygen, and the penetration *from* the blood, of the carbonic acid gas.

In presence of these considerations it seems a demonstrated fact, that the universally accredited explanation of the respiratory process, is a complete misapplication of theory, for it neither involves nor implies any *account of* the very phenomena, in which the process itself consists. It merely takes account of the behaviour of certain gases or substances engaged in a certain process, not in the smallest particular like the process we wish to account for. In

fact, the so-called law of "diffusion" of gases, is simply *nominal*, being nothing more nor less, than the *fact* of the mingling or diffusion of certain measures of different gases *even where* a solid septum intervenes between the two. While the respiratory phenomena so far as the same substances are involved, consist in the separation or abstraction of a gas in a natural state of combination in a viscid medium *from* that medium, in spite of the presence of a tube which hermetically holds both, and, secondly, of the passing of a certain amount of oxygen in association with nitrogen, through the whole of the same tube into the blood.

The consideration of these facts has long impelled me to find an explanation of the respiratory process in accord with the facts. Certain general considerations present themselves, of which we may here take note.

All physiology is a *process*, and *consists of a progressive variation* in what would otherwise be a *state*, that is a condition following the association of a process.

It is then a "*process*" we have to understand.

Without exception, all bodily processes, are based upon anatomical conditions, i. e. the character and arrangement of the tissues. The impulsion of the blood, is dependent on the tissues and the change in *movement* of the heart. This motion of the heart is a change in position of every anatomical element composing it. The act of digestion is a movement dependent on the movement of the stomach. This movement is a change in position of all its anatomical elements.

In the respiratory process the lungs are continually passing from one state or condition to another, without cessation,—from one state in which their tissue is of the least, to one, in which it is of the greatest magnitude. This progressive change in the feature of the entire lung, involves a change in the feature of its various anatomical component elements. At their regular minimum size, the lungs do not occupy the whole of the pleural or thoracic

cavity: at their maximum size they completely fill it, and extend it by descending upon the abdominal cavity. This regular, constant, and reciprocal progression involves a change of feature and size of even its minutest elements. The entire change in feature and magnitude of the whole lung is only the aggregate of the change of size and figure of each of its elements. Of course this progressive alternation, will most change the figure of the anatomical elements of the lung most easily changed. In the extreme or terminal portion of the lung, there ramifies the most compact capillary system yet found in the human body, and the readily yielding sides of this part of the tissue would subject them to the greatest part of this change in enlargement and diminution of lung tissue. The movement of the lungs is *un*remitting. From the moment it reaches its greatest dimensions to recur to its least dimension, and again from the latter to the former, there is a progressive movement. The moment of the greatest size, from which the lung recedes, and the moment of least size, from which it *re*enlarges, are not periods of cessation, but *stages* of the movement. And it is during these stages of the movement, that the greatest change in the figure of the vascular channels is made, and at the movement continuing from these stages, either toward decrease or increase of size —there is the *mean* anatomical state of these vessels.

The capillary net-work of the cellular, vesicular, or saccular portion of the lung-structure, is so close as to leave but slight intercapillary spaces, the outer surfaces of their walls being nearly in contact, and between there is no *matrix* or intercapillary tissue. They ramify upon the *outer* or pleuro-pulmonary surface of the bottom and sides of the air-sacs, and between them up to the dividing plane of the sacs. Their position is one in which they receive transversly the full force of any change in the size of the air-sacs.

During the progressive stages of enlargement of the lung simultaneous with the increase in the volume of the

increasing air, the air-sacs are enlarged in size and calibre, by increase of calibre both in the direction of their longer axis, and of their shorter. The pressure of the accession of incoming air is borne directly by the capillaries, upon their transverse limits, and thus upon their contents, causing a *remission* or an *impulsion* in their rate of advance. This is the advanced stage of enlargement of the lung-tissue. As the air recedes from the bronchial tube, the tension on the air-cells abates. The return of the air-cells or sacs, to the least diameter and size, pushes the residual air along the bronchial tubes, and the stage of movement is reached in which the lung tissues have their least size. This is the stage of the uniform and uninterrupted flow of the contents of the capillaries to be again, without cessation of movement, changed into the stage of enlargement.

There is thus in the capillary portion of the lung tissue, consecutive remission of rate of flow, in a stage of the onward movement of their contents in which the volume is positively *retarded*, and one in which the retardation is followed, by a *brisker* or more *hurried* flow. Though I have not been able experimentally to determine this point, it is during one of those stages, that the carbonic acid transudes from the capillary walls, and through this epithelium layer and enters their interior, and during the other, that the oxygen is absorbed into the plasma, from which it is imbibed by the red-corpuscles.

But if we continue to follow the process of enlargement of the tissues, we shall convince ourselves with entire certainty, that it cannot take place, without inducing the effects on the capillaries and their contents, we have described. The innumerable branch cavities of the great bronchial tree, are a bundle of air-containing elongated hollows, the extreme or terminal portions of which are the air-sacs or cells. When the entire hollow portions of the lung contain their least volume of air, the tissue of the cell is at its *least* tension; with increase of volume of

air ; the tension caused by the increased volume and pressure of air rises, and is communicated to the capillary structure, which surround them, and ramifies between them. That portion of the capillary web running between is subjected to the pressure on both sides of their walls. On the other side, the pleura or binding coat of the under tissue, offers resistance to the enlargement of the tissue it circumscribes and unites. Even while in the process of enlargement, its resistance to it is being overcome, it exerts more or less pressure upon the tissues it holds. Of these the capillaries would be affected most. We have thus during enlargement a combined pressure upon these blood-holding hollows, from the pleura and from the air which primarily increases the calibre of the air-sacs, and secondarily exerts pressure upon the vessels immediately in contact with them.

That certain anatomical or tissue movement, involving a change in function for the time being in the tissue, is demanded where notable physiological transactions occur, is exemplified in the movements of the heart, the stomach and the intestines. The movement of the heart and the anatomical changes in its tissue, which constitute that movement, alone give the needed impulsion to the blood. And similarly the changes in the tissue of the stomach alone give the needed transudation of the gastic juice. So, also the changes of tissue in the intestines alone furnish the products of that canal, and slowly carry onward the undigested food. To the *movement* of the lungs and the regular tissue changes it involves is to be assigned the transpiration of the carbonic acid absorbed and carried forward by the blood, and the absorption of the proportion of oxygen which enters the blood. A portion of the tissue changes, which take place in the heart, is so nearly similar to those I have described in the lungs that the former suggest the latter. Thus in a shortened or abbreviated diastole, and hence increased frequency of the systole, the tissue of the heart is not permitted to reach its normal

limit of enlargement, and hence a diminution of its actual contracted effect.

ARTICLE III.

Facts and Philosophy of Dental Progress. No. 3.

By Professor Austen.

In our last paper it was stated that mechanism and manual dexterity form the distinctive elements of dentistry, as a branch of the Art of Healing—that the Dentist is, in nearly every department of his art, necessarily a mechanic. It is a grave error therefore to undervalue this essential element, and suppose that any one may be trained for dentistry as readily as for medicine or surgery: but perhaps a greater error is the very prevalent idea, that every ingenious youth is a distinguished dentist in embryo.

Protest against this mistake is the more necessary here, as all our illustrations of dental progress will be drawn from its mechanical side; since it is because of these that its progress has been so rapid—superadding the benefits of mechanical invention to the aid derived from physiological discovery.

From the moment of the patient's entrance into the office, you begin to appreciate the assistance rendered by improvements in dental mechanism. The chair may be like any other, with the simplest form of *rest* for tedious operations. And it will not be denied that, in such chairs, much work has been done of unsurpassed excellence. But in the modern dental chair, whilst there is frequently unnecessary and complicated contrivance, there is undeniable advantage in the facility of placing the patient in various positions with ease and comfort. Restlessness on the part of patient, and weariness on the part of operator, are serious obstacles, and whatever lessens them is not to be despised, because the aid comes from the chair maker.

The old practitioner, who began with a simple arm chair and knows that he has learned to do good work in it, is prouder of his work perhaps, than if done in a chair, which might have spared him some dorsal twinges of his own and some restless turnings of his patient. Attachment to the "old arm chair" is very excusable: but becomes weakness, where it refuses to spare others the experience necessary to make it a "dental chair."

Complicated chairs, jeweled instruments, beautiful rooms and light artistically arranged, do not guarantee good dentistry: but they certainly (the jewels excepted) are not hindrances to the exercise of skill. They are often the pharaphernalia of incompetent quackery: but quite as much bad work has been done in dingy rooms, with dirty surroundings and few and imperfect appliances. It is painful to enter an office, where the only deficiency is in the operator; but scarcely less painful to see one, whose skill has overcome difficulties, persisting in the contest.

These remarks apply not to chairs alone, which rank among less important improvements, but to all the means offered by inventive genius, for the more perfect develpement of manual skill. Long practice makes a defective instrument useful and possibly indispensible to one; but another, commencing with the improved implement, is spared much waste of effort, and can, perhaps with less skill, produce the same results.

How far one is called upon to give up accustomed tools, methods, or materials, is not easily decided. Certainly there is no practice more fatal to success than the too-frequent one of perpetual change. No mechanism insures good results, apart from experienced manipulation. The operator, who is always praising the latest invention, may safely be set down, as one who has an imperfect knowledge of any. It would be amusing were it not so painful, to hear one of these experimental dentists asserting five times, within twice as many years, that "now

since adopting this plan, my operations never fail." Constant to no one method, he is successful in none and his skill is far more wasted than is that of the old fogey, who will accept no "new fangled" help.

DWINNELLE's success with chrystal gold cannot tempt MAYNARD to give up non-adhesive foil; because such foil, under his hand, gives a *perfect* result, and more cannot be required: because also, he can do with foil what, without long experience, he could not with the sponge; and because the older material has stood the test of time. But all are not Maynards in the use of an old, or Dwinnelles in the use of a new material.

Long and *exclusive* use of a method or instrument is essential to the complete developement if its merits and dental progress is equally served by him who persists in the old, as by him who identifies himself with the new. ATKINSON's little mallets will probably hammer out startling facts and possibly upset some old ideas in physiology. We may even anticipate the time when miniature "Nasmyth Steam Hammers" will do all the work of filling cavities, prepared by diminutive "Steam Excavators." Yet I think manufacturers of the old-timed foil will continue to have customers and am not sure that they will not be called upon occasionally to open again some old account. When you wish, gentlemen to try a new string to your dental bow, never throw away the old one. Possibly the new one may prove stronger; but the old strings have been tried and have this merit, that they improve with use. Above all, take care that, in the recital of your experiences, you do not shoot with the "longbow." It is a weapon which has done vast mischief to Dental Science.

An important question arises here, as to the fitness of a specialist to teach. It would be irrelevent to the subject in hand to enter fully into it: but it may be stated briefly —the specialist is the best possible *teacher* of his speciality; the worst possible *adviser* as to its relative value. In my papers on DENTAL EDUCATION, this point will be fully

considered. As regards Dental Progress, the specialist is a necessity. He developes truths which a judicious eclecticism disseminates and makes generally useful.

Returning once more to the chair, in which I place myself as patient—I may be a little indignant with the operator, who is regardless of my bodily comfort during a tedious operation: but if I find him adjusting too many screws and cranks and slides, I begin to have an uncomfortable suspicion that he is more "fussy" than skilful. If I see him take from a dirty drawer of files, teeth and other miscellanies an old rusty key, I tremble with fear and disgust. But if I see him hesitatingly turning over his polished collection of fifty or more "alveolas,"* I think I would rather try the blood-stained "key," or else subside into the unconsciousness of nitrous oxide.

Too much apparatus excites distrust; too little impedes skill. It is a rule in Art to use the fewest tools; but these should be the best. It is another rule to have them of simplest form. The more complicated an instrument, the more limited is its usefulness. The operator's cabinet should contain a few simple tools for daily use; others again, including the more complicated, for exceptional cases and modes of practice. He should avail himself of all appliances which give convenience and facility of operating and may very properly consult the comfort of his patient. But he must not become the slave to any of these appliances, or insult his power of resource, by having separate instruments for every emergency. One will have six tools with the same point, but differently curved; while Maynard will use but one, curving it at the moment as the occasion may require. This one instru-

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*Will the Commmittee on Instrumental nomenclature, inform the writer why the final r is so unnecessarily retained in the molar forceps? Why not call them "Molas?" There is no wish to make a mountain out of a mole hill; but why, in search of a trade mark, contort alveolus or alveoli into an impossible alveola, when the word "molar" so naturally suggests the analogous adjective "alveolar."

ment, with the ability to adapt it, is worth six times the other six. Again, he will accomplish with the napkin all that the best saliva pump can do; and yet this is an excellent instrument, for comparatively few can manage the napkin.

These simple illustrations, borrowed from an eminent practitioner, are given to show the necessity for varieties of apparatus, adapted to individual peculiarities, or deficiencies. It is scarcely fair to measure the wants of the average, by the requirements of the most skilful. Hence every operating case contains more than any operator can use with advantage; but not more, if judiciously chosen, than is necessary to enable him to select the daily tools which best suit his hand. In astronomical observations there is a correction for "personal error." Now, as in the observatory, a given observer will take the moment of transit invariably a little too soon or too late; so every artist or mechanic will have some peculiarities in the handling of tools, calling for differences in their number and shape.

That the best possible fillings have been made with old-fashioned tools and materials and by time-honored methods, is undeniable, and continuance in their use is imperative, until their substitutes have stood the test of experience. It is to the honor of Dentistry that so many are conscientiously searching for better, and the profession will be greatly the gainer, whatever the success of any single experiment.

In this search for the best, the older practitioner should be careful, how he abandons the *proven* good, for the *untried* better: and the younger practitioner has need to be careful in the choice of advisers and teachers, careful how he adopts too many methods, and careful how he cramps his inventive resource by an accumulation of tempting machinery.

ARTICLE IV.

The Physical History of Various Nations of the Earth, With Special Reference to their Teeth.

By Dr. J. Allen.

Read before the American Dental Association, in Cincinnati, Aug. 2, 1867.

Having spent some thirty-eight years in Dental practice, I have often been asked these two questions: first, "are not the teeth of the people of this country worse than those of other nations of the world?" And, second, "what is the cause of so many bad teeth in America?" These are two important questions involving the welfare of some thirty millions of inhabitants. In order to answer them satisfactorily, we have found it necessary to examine the physical history of mankind, in order to compare nations with nations in reference to their teeth, taking into consideration their food, habits, customs, climate, etc. etc.

In prosecuting these researches we find there are many nations whose teeth remain sound, even to old age, and it is as rare for them to lose a tooth as it is an eye or a limb. While in this country it is estimated that there are more than twenty millions of teeth lost annually from decay. And yet we find that the same general physical law which provides for the building up and sustaining the human structure, prevails among all nations, and that the divine architect of man has furnished an abundant supply of materials for all parts of the system. The body of man, with all its different parts and organs, is composed of only a few simple materials. These are combined in certain proportions, in order to give strength and utility to the whole structure. These materials are component parts of his food; and although the nutrient substances used by the inhabitants of different parts of the world appear quite dissimilar, yet the food provided for them in various countries possesses the same general nutrient properties and chemical constit-

uents everywhere that are essential for the human organism.

We will now proceed to notice some of the historical evidences which go to establish the fact that the Americans, as a whole, have worse teeth than the inhabitants of other nations. In portions of Europe, where the people, like the Americans, discard a large portion of the mineral element from their food, they also have bad teeth ; but among the Peasantry, and also in those sections where the inhabitants do not change the proportions of the mineral constituents of their food, they have good teeth

But let us turn to the historical accounts of other countries where bolting cloths are not used for this purpose.

In Prichard's Researches into the Physical History of mankind he says : "the Albanians of Lesser Asia live principally on milk, cheese, eggs, olives and vegetables. Sometimes they bake bread, but often eat their corn or maize boiled." Hippocrates says they are very strong and muscular, have oval faces, a ruddy color in their cheeks, a brisk animated eye, a well proportioned mouth, and *fine teeth*. In Central Africa, north of the equator ; Prichard says "the Mandingo tribes have the barbarous custom so common among the Pagans of Africa, of filing their teeth to a point."

In eastern Africa, among the different races of Abyssinians, we have the following description by this eminent author : "Their countenance is full without being puffed, their eyes are beautiful, their mouth of moderate size, their lips thick, their *teeth white, regular, and scarcely projecting*." Among the races of people inhabiting Nubia and other countries between Abyssinia and Egypt, Burckhardt says : "They are a handsome and bold people of a dark brown complexion, with beautiful eyes and *fine teeth*." In the western parts of South Africa, comprising the Congo Empire, Proyart, who has graphically described it, says ; "The negroes are well made, very black, with *white teeth* and pleasing countenances." In

Dr. Oldfield's ethnographical researches in the interior of Africa, among the Felatahs, he says: "The color is light brown, features regularly formed, handsome mouth, thin lips, *with teeth as white as ivory.*"

We will now pass into Asia, and there among the mountain tribes of Dekham in India, Dr. Maxwell says: "The Khonds are a dark race of men, straight, well limbed, and free from obesity, which makes them have a tall appearance. Many of the men have a pleasing expression of the countenance. Generally, however, the nose is flattish, the cheek bones high, the face round, the lips and mouth large, displaying *fine teeth.* The country produces rice, and most of the vegetables which are common in Europe." Among the Turkish tribes of Kiptschak, the Tartars of Kasan," says Erman, "are of middle stature and muscular, but not fat. Their heads are of an oval shape, their countenances of fresh complexion, and fine, regular features; their eyes, mostly black, are small and lively; their noses arched, and thin, as well as their lips; their hair is generally dark. and their *teeth strong and white.*" We will now pass to that part of Asia between Hindostan and China, where we find, according to Finlayson, that the Siamese blacken their teeth and redden their mouths with a masticatory of lime, catechu and betel, which gives them a disgusting appearance. Baron Larry, who is well known as an eminent author on physical subjects, says: "The inhabitants of Eastern Arabia are somewhat above the average statue, robust and well formed. Their countenances oval, and copper colored, the forehead broad and elevated, the eyebrows black and bushy, the eye dark, deep-seated and quick, the nose straight and of moderate size, the mouth well-shaped, *the teeth beautiful and white as ivory.*" "In Egypt," the same author says, "the surface of the jaws of the Arabs are of great extent and in a straight or perpendicular line. The alveolar arches are of moderate size, and supplied with *very white and regular teeth*, the canines espe-

cially, project but little." The Arabs eat little and seldom of animal food.

We will now pass to a group of islands situated in the great Southern Ocean, between the eastern coast of Africa and the western shores of the new or American Continent. This group of islands received from Captain Cook, the name of the Society Islands. Mr. Ellis who spent some six years among the inhabitants of Tahiti as a missionary, had ample opportunity of observation, says: "These people are above the middle stature: in physical power they are inferior to the New Zealanders. The mouth of the Tahitian, he says, is well formed, though the lips are sometimes large, yet never so much so as to resemble those of the African. *The teeth are always entire,* except in extreme old age, and though rather large in some, they *are remarkably white and seldom either discolored or decayed.*"

Mr. Anderson, who visited New Zealand with Captain Cook, says: "The nations do not exceed the common stature of Europeans, and in general are not so well made especially about the limbs. Their color is of a different cast, varying from a pretty deep black to a yellowish or orange tinge, and their features are also various, some resembling Europeans. Their faces are round, with full lips, their eyes large, hair black, straight and strong. *Their teeth are commonly broad, white and well set.*" Another writer, Captain Fitzroy, in describing the people of New Zealand, where he speaks of their teeth, says: "They are like those of the Tucgians, and, at the first glance, remind one of those of a horse. Either they are all worn down, in old persons, canine, cutting teeth, and grinders, to an uniform height, so that their interior texture is quite exposed, or they are of a peculiar structure," undoubtedly the former". The natives who live near the hot, sulphurous waters on the borders of the lake of the Roturna, have the enamel of their teeth, especially their front teeth, yellow, although this does not impair

their soundness, and is the effect, probably, of the corroding qualities of the thermal waters. To the eastward of the Society Islands, in the South Pacific, are the Gambier Islands. They are inhabited by a people fairer than the Sandwich Islanders. The average height of the men is about that of Englishmen, but they are not so robust. In their muscles there is a flabbiness, and in the old men a laxity of integument which allows their skin to hang in folds on different parts of their body. They have an Asiatic countenance, the teeth in the fourth class especially are not remarkable for evenness or whiteness, and seem to fall out at an early period. With reference to these physical characteristics, Dr. Pritchard says: "Two causes may be assigned: the nature of their food and their indolent habits."

We will now pass to Easter Island, which is situated perhaps the most remote from the great continents of all inhabited islands on the globe. Captain Beechey has given the following physical account of the inhabitants. He says "They are a fine race of people, especially the women. They have oval countenances, regular features, a high and smooth forehead, black eyes and *fine teeth.*"

Next, let us take a view of the Sanwan group of islands, situated also on the Pacific ocean, in latitude thirteen and fourteen degrees The inhabitants of these islands are strong, vigorous, and well proportioned. Their features are all referable to a common type. This type is thus minutely described: "The nose is short and wide at the base; the eyes are black, and often large and bright, the forehead narrow and high, the mouth large and well filled with *white and strong teeth.*" These islands abound in pigs, dogs, fowls, birds and fish, and likewise in cocoa nuts, guava, banian trees and sugar canes. Belonging to another group, in the same ocean, are the Tarawan Islands. The people of this group differ from those above described. They are of middle size, their color is dark copper, their hair is fine, black and glossy, the nose

slightly aquiline, the mouth is large, with full lips and *sound teeth.*

Vanikoro, another group of these islands, is also in this great ocean. The sea coast is inhabited by a black race, who cultivate the taro, iguamas, bananas and the kava. "The inhabitants," says Dr. Urville, "belong to the black race of the great ocean approaching to that of proper negroes. They are generally small, their countenance has a singular resemblance to the ourang-outang, the eyes are large, and deeply set, resembling in form and color those of the negro. The lips are large, the chin small, the hair crisp. The use of the betel root destroys their teeth, and gives them a red tinge round the mouth. The women are horribly ugly, the old men are bald." Next we will proceed to the Archipelago, of the Fiji or Fejee Islands, which lie to the eastward of those above named, and are situated between fifteen and nineteen degrees of south latitude. This a large group of islands, many of which are inhabited. The largest of this group is called the Great Viti. The people of this island are called Vitians. They are tall, well made, active and muscular. Their faces are broad, nose large and flat, large mouths, thick lips, and *sound, white teeth.*

(To be Continued.)

ARTICLE V.

The Rise, Progress and Present Status of Dentistry.

By H. F. Bishop, D.D.S., of Worcester, Mass.

Mr. President and gentlemen of the Mass. Society of Dental Surgeons.—To-day—Time, that ceaseless traveller wafts us by another land mark; to-day brings us one year nearer our final home, to-day, we have our third anniversary and commence our fourth year of existence. Our kind Heavenly Father has dealt gently with all our members; none have been called the past year to walk the golden street of that bright realm where no pain exists—where neither moth nor rust doth corrupt, but still the

unbroken band are toiling and battling with pain, decay and corruption, to keep their destructiveness in check and alleviate the suffering and waste of human life. Two years ago our worthy President addressed us upon the aims and duties of the profession; in which able address we were reminded of our obligations to our families and dependants as well as the great duty we owe to *our-selves* in order to maintain our usefulness and be thus enabled to do our whole duty. A year since, we listened to our first Vice-President upon the past and future of the dental profession, when many incentives were held out for its elevation, while we are transmitting it to our successors.

In reviewing the present status of Dentistry, let us hastily take a chronological survey of its rise and progress, and then consider the important developements of the past year, as well as notice the increasing claims the science is making upon an appreciative public.

How long has dentistry been practiced? Who first substituted artificial teeth for the loss of natural ones? Who discovered the utility of filling teeth for their preservation? These are questions often asked and not so easily answered. Dentistry, it has been suggested originated almost at the cradle of the human race, yet comparatively little can be said of its importance in the scientific world till the present century. Mankind from the first-born—Cain and Abel, have been endowed with the rudiments of twenty deciduous and thirty-two permanent teeth —all of which are subject to disease and accident; hence the dental doctor. From the days of Adam (the only man who never had infant teeth) living in the first ten centuries to the days of Methusaleh who died the year Noah entered the ark, and existed in the last ten centuries before the flood, little or nothing can now throw light on their time; we can only presume that our art could scarcely have been been needed in those early days of the world's freshness.

Hippocrates born four hundred years before Christ, alludes to the inserting of teeth fastened by gold wire; Celsus a physician in the first century, describes the extraction of teeth and other operations; Galen the celebrated Greek physician flourished in the second century; he was appointed medical superintendent of the gladiators in his native city, in which melancholy duty it is to be supposed he must have gained some knowledge of the care of wounds, and possibly some experience might have given him new dentalogical facts. The Emperor Marcus Aurelius placed his son Commodus, a tender youth of nine years old, under his care—but he has failed to tell us the condition of his six year old molars, whether they were saved or were extracted. Whether the Egyptians and Brahmins, once the polished nations of the earth, were skilled or not in dentistry, must remain a matter of conjecture, since all traces of their learning and ancient history were lost when the grand library at Alexandria was burned about the year 640. If stuffed teeth have been found in mummies, we have no certainty of the operation being performed on the living subject, but it may have been introduced by the embalmer to prevent further decomposition.

It is supposed that Albucasis was the first to suggest the supplying of lost teeth by other human teeth or those of animals, or by artificial ones of bone or ivory.

Following on up the historical hill of time from the destruction of the library in the 9th century and the dark ages following, we come to the 16th century—the art of printing having in the meantime come to the aid of science. Eutachius the distinguished Italian anatomist flourished at this time and published the first work of any consequence on dentistry; and Ambrose Paré describes the manner of replacing the teeth and the use of obturators.

*Taking a survey of the world in the 16th century at it close, say one hundred years after Columbus discovered our continent, Southern Europe had decidedly the advance of all other countries in knowledge and acquaintance with the sciences—Spain and Italy taking the lead. In the 17th century publications gradually multiply, and looking northward on the continent of Europe we see new lights—France has its Muller, Martin, and a few others. Germany is well represented by several works published at Leipsic—Switzerland has its celebratedRyff—Austria and Prussia publish works of which some appertain indirectly to dental surgery. Up to this period we recognize gratefully the influence of medical and dental literature upon the profession, but not until the 18th century do we find many practical dentists who have born our science along as a speciality. Then, France getting the lead had scores of able men in the field, many of whose works are useful at the present day† :—the distinguished dentists were quite generally writers upon the science of their profession, and it is certainly singular that with so much talent and the growing light on the subject, a higher standard should not have earlier been established. The first idea of porcelain teeth is due to a French apothecary as early as 1774—having an ivory set which gave him great inconvenience, he experimented until with the help of a chemist and porcelain manufacturers of Paris, he succeeded in making a porcelain of a grayish color, which shrunk very little. In 1776 he communicated his secret to the French Academy and was elected a member in consequence. But it was Musseer de Chemant a distinguished dentist of Paris who improved these teeth and

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*Both Arculanus and DeVigo about this time filled teeth with reference to temperature—the latter using gold leaf it is said. Thus stuffing the teeth for alleviating pain, gradually led the way to plugging them with metal for preservation.

†Jourdain, Beaupeau, Fauchard, Bunon, and Bordet, all lived and flourished at this period.

obtained a patent from Louis XVIth for the exclusive right to make and set them ; he encountered however violent opposition from French dentists in their introduction.*

About this time England begins to have equal claims upon our attention: she had in the field Hunter who, though not a practical dentist, is entitled to our great admiration and respect. Blake, Curtis, Berdmore, who was dentist to George the Third, Woofendale and others. The latter was one of the few Europeans who came to America and established a fame upon both continents—a compliment which Americans have paid with interest in the 10th century. Just one hundred years ago (from 1766 to 1768) Robert Woofendale a pupil of Berdmore practised in the city of New York for two years—the first *regular* dentist it is said in this country. Near the close of the century he returned to America practising again a few years in New York, and then leaving his business to his son John.

John Woofendale was the first dentist of whom my childish ears heard, his services having been called in the early part of the present century to set teeth for my father ; the said teeth were calves' teeth reduced in size by a file and set on pivots of wood ; and they were afterwards supplanted when necessity required, by the ingenuity of the patient himself, who subsequently related the incident to his children, four of whom became dentists.

As early as 1784 Dr. James Gardette, a Frenchman by birth was established in Philadelphia after a succession of trials for business at Newport, Boston and New York, and remained in practice there forty-five years. He was the first to apply the principle of suction or atmospheric air to sustain artificial teeth in the mouth, which he discovered as early as 1800. He was one of the earliest to adopt gold for filling instead of lead and tin then in use,

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*And it was many years before they came into general use—Europeans still adhering to ivory and hippotamus tusk, both of which have been used by them to some extent, up to a very recent date.

preparing his gold himself from Dutch ducats. His valuable discoveries attracted the attention of distinguished men in the profession in France, and other countries.

Isaac Greenwood the son of a professor in Harvard College practiced in Boston for a long time, and his son, John Greenwood was said to be the only dentist in New York in 1790. He struck up a gold plate by swaging for the base of artificial teeth in 1799, and claimed to be the first person who had done so in America. He was Washington's dentist and made him several sets of teeth.*

(To be Continued.)

*The estimation in which he was held by Washington, may be seen by the Washington letter in Harris' Dental Dictionary.

ARTICLE VI.

A Monster.

LEXINGTON, C. H., S. C., *July* 8, 1867.

Editors American Journal Dental Science.

GENTLEMEN :

A MONSTROSITY of no ordinary interest having recently come under my notice, I have thought it might prove sufficiently worthy of record to find a place in the columns of your Journal.

On the first of the present month there was born in this village a child having the following peculiarities. Of the face the bones in general are perfect except the maxillæ which present not the slightest trace of alveolar processes, the tongue, which is rather large, resting directly upon the lip and almost protruding beyond it. There is also a longitudinal fissure of the hard palate. The orbits, large in size, protrude to a frightful extent, so that the malar and frontal bones seem continuous, and the globes of the eye resemble two hemispheres resting upon the single

bone thus formed, as though a sphere had been divided in half, and the two segments laid on a plane resting each upon the flat surface of the section. Underneath the lids, however, which are never closed, no natural eye is discernable, but only a spherical sac cantaining a dirty yellowish brown pus-like substance, similar to that which it is constantly discharging in small quantities.

The temporal bones are but partially developed, but there are four parietals, perfectly formed, unusually large, and semi-oval in shape. The occipital bone appears to be single, but extremely large, rather oblong, or perhaps rectangular. The frontal is as large as the whole face below it, and is polygonal in figure.

The left eye is remarkably mobile. By crying a convulsive action is excited which protrudes the entire ball from its socket, the lids being behind it. Again it is immedidiately retracted to its former position, the lids partially closing over it. Respectfully,

C. G. SIMMONS,

Student of the Baltimore College of Dental Surgery.

CORRESPONDENCE.

Organization of Tennessee Dental Association.

PURSUANT to a call made at a preliminary meeting of the Dentists of Memphis on the 20th of June, the following members of the profession convened at Nashville on the 26th of July and organized the *Tennessee Dental Association.*

Present—Drs. Wm. H. Morgan, Nashville; G. W. Acree, Memphis; Wm. T. Arrington, Memphis; J. B. Wasson, Memphis; J. A. Arrington, Jackson; H. M. Acree, Clarksville; R. Russell, Nashville; J. C. Ross, Nashville; S. J. Cobb, Nashville; W. P. Wilson, Nashville; Alex. Hartman, Murfreesboro'; M. McCarty, Pu-

laski; T. E. Beech, Franklin; W. R. Johnston, Columbia.

At 10 o'clock A. M. with Dr. W. H. Morgan as chairman pro. tem., and Dr. Ross, Sec., the house was called to order, and the following committee appointed to draft Constitution and By-Laws—Dr. Wm. T. Arrington, Chairman; Dr. S. J. Cobb, Dr. W. R. Johnston.

A Nominating Committee was also appointed—Dr. J. B. Wasson, chairman; Dr. Alex. Hartman, Dr. R. Russell.

While the committee were in session Drs. G. W. Acree of Memphis and W. H. Morgan of Nashville addressed the meeting upon the subject of *Dental Education, State and Local Organization,* and the importance of prompt and immediate action towards the general advancement of the dental profession.

Committee on Constitution and By-Laws presented a paper which was received, and the committee discharged.

On motion the paper was taken up by section, discussed, voted upon and approved, then voted and approved as a whole, and adopted as the Constitution and By-Laws under which to organize.

Committee on Nomination made the following report which was received—Dr. W. H. Morgan for *President*; Dr. J. B. Wasson, 1*st Vice President;* Dr. J. C. Ross, 2*nd Vice President;* Dr. Wm. S. Arrington, *Rec. Sec.;* Dr. R. Russell, *Cor. Sec.;* Dr. Alex. Hartman, *Treas.*; *Ex. Committee;* Dr. G.W. Acree, Dr. J. A. Arrington, Dr. W. R. Johnston. Meeting then adjourned, and convened at 2½ P. M.

An election was held and those nominated duly elected by ballot to serve as officers of the association for the term of one year, and after being properly installed the President made a few appropriate remarks, and then declared the Association organized and ready for business.

On motion of Dr. Arrington it was resolved that the *American Code of Dental Ethics* be approved and adopted

by the Association. Adjourned to meet to-morrow morning at 9 o'clock.

SATURDAY, *July 27th.*

Society met, minutes read and approved. On motion it was resolved that the Semi-Annual meeting be held at Jackson from the 20th to the 24th of next December, and the Annual Meeting to be held in Memphis, on Wednesday, Thursday, Friday and Saturday preceeding the last Tuesday in July, 1868.

Drs. Morgan, Acree and Beech were duly elected delegates to the American Dental Association at Cincinnati.

Many interesting subjects were discussed, and the liveliest interest manifested by all present.

It was resolved that the Secretary be requested to furnish the *American Journal of Dental Science, The Dental Cosmos,* and the *Dental Register* with a synopsis of the proceedings.

Adjourned at 2 P. M. to meet at Jackson on the 20th of December next.

WM. T. ARRINGTON, *Rec. Sec.*

ANSWERS TO QUERISTS.

Properties, Generation and Administration of Nitrous Oxide Gas. Query 2nd.—*Generation of Nitrous Oxide Gas? Answer Continued.*

THE gasometer being in position, and connected by means of rubber tubing with the wash-bottles, the stopcock turned on, and an extra weight added to the cords passing over the pulleys, to assist the ascent of the bell or receiver as the gas enters it, we proceed as follows:

Fill the retort half or two-thirds full, according to the quantity of gas desired. A medium sized retort filled half full of the crystalized nitrate of ammonia will generate about thirty gallons of the gas, after the water in the gasometer has become impregnated with it. The crystalized nitrate of ammonia is preferable to the fused am-

monia for the reason that pure white crystals cannot be made from an impure article of this salt; while the fused preparation may contain certain impurities without our being able so readily to detect them.

When, however, we have reason to suspect the impurity of the salt in use, such for example, as the presence of the chloride of ammonium (nitrate of ammonia,) which would liberate chlorine when it is decomposed by heat, it may be tested for this impurity as follows: "dissolve some of the nitrate of ammonia in pure water; also dissolve a a small quantity of the nitrate of silver in pure water, and pour the solution of the nitrate of ammonia gradually into that of the nitrate of silver; if any soluble chloride is present, a grayish white precipitate will first be formed, which will render the solution milky in appearance, the precipitate gradually settling to the bottom."

The retort containing the ammonia is then connected by means of rubber tubing with wash-bottle No. 1, and heat applied by means of a gas, kerosene, or alcohol lamp.

Instead of slipping one end of the rubber tubing over the neck of the retort and thus making the connection with the wash-bottles, as is frequently done, a soft rubber stopper should fit closely the orifice in the neck, with a short glass tube passing through this stopper; the rubber tubing can then be slipped over the projecting end of this glass tube. By making such a connection as this, the rubber tubing is preserved in a great measure from the heat of the retort, which otherwise soon destroys it.

Where gas is used under the retort it should burn as low as possible until the ammonia begins to melt; then more heat can be applied by increasing the flame, and the liquid ammonia be brought to the boiling point.

The same rule is applicable where kerosene and alcohol are used to generate the gas. Care is necessary, both for the purity of the gas and the safety of the retort, that the ebulition be not too rapid, *as white fumes should never ap-*

pear in the wash-bottles. Should the heat be too intense the ammonia "will be volatalized and wasted, as will be indicated by the the appearance of a white cloud instead of a colorless gas, or its decomposition will be attended by the formation of such objectionable compounds as nitric oxide and hyponitrous acid, either of which will, of course, necessitate the reduction of heat and careful purification; other impurities may also be given off, such as nitric acid and chlorine." Where the ordinary gas, kerosene or alcohol lamp is used under the retort, the heat may be regulated by increasing or diminishing the flame.

Sprague's apparatus has attached to it an automatic regulator, by which a uniform temperature of the ammonia can be maintained during the entire process of generating the gas.

The lamp used in generating the gas, should be removed before all the ammonia in the retort is exhausted; otherwise the retort is liable to be fractured by the heat.

After the removal of the heat from the retort, and as soon as the gas ceases to bubble up through the liquid in the first wash-bottle, the connection with the retort should be severed by removing the rubber tubing from where it is connected at the orifice of the neck.

Neglect in doing this will result in the fracture of the retort, from a vacuum being formed by the condensation of the steam, the atmospheric pressure drawing the contents of the first wash-bottle over into it.

The desired quantity of gas being obtained, the small stop-cock at the base of the gasometer, which allows the gas from the wash-bottles or purifier to enter the receiver, should be closed; the extra weights, before referred to, should be removed as the remaining ones balance the bell in the tank.

It is also advisable to remove all except the upper and smaller weights when the patient is inhaling the gas, that no obstruction may be offered to its flow from the receiver into the inhaling tube.

SELECTED ARTICLES.

ARTICLE VII.

Magnetic Somnambulism.

Translated from the French of Nysten.

By Wm. Mason Turner, M.D., of Philadelphia.

Somnambulism is an affection of the cerebral functions characterized by a kind of an aptitude to repeat during sleep those actions which are contracted by habit, either in wandering about or in executing different movements, of which, however, on awakening, there remains no recollection whatever. Somnambulism is, perhaps, a physiologic state or condition, a degree more exalted than the ordinary fantasies of slumber, rather than a nervous affection.

Magnetic Somnambulism.—This is a peculiar nervous condition, into which we can throw, by a sort of mental influence, individuals of a high nervous sensibility—particularly hysterical women. When somnambulism is provoked artificially, the most singular phenomena are observed. Some feel the hallucinations of sight, some of hearing, some of odor, etc., and are falsely made to believe in a transposition of the senses which does not exist. In somnambulism we see sometimes the pathetic faculties, intellectual and moral too, acquire a wondrous developement. The memory attains an astonishing precision, and thoughts are delivered in a correct and elegant language.

The theory of this mass of phenomena is clearly cleared up by a knowledge of the physiology of the brain, but loses beyond that all that appears marvellous in it, when we have recourse to the state of scientific facts. We know that in a condition of the most mental harmony, that our internal images are dependent on our external sensations; there is a complete subordination of abstract contemplation to direct observation, and to employ here a trite but very

just phrase, *we see things as they are.* But it is demonstrated that even in persons gifted with a superior judgment, it is possible by purely artificial means to develop a cerebral condition in which the *within* takes the place of the *without*, and they are made to behold things otherwise than they really exist. This confirmed mental alienation is nothing but a persistence of that condition, in which we make, in the observed phenomena, the most complicated hypothesis. For a long time it was customary to attribute certain conditions, it may be physiologic or it may be pathologic, to the influence of demons. In the witcheries of magic, as in the science [?] of magnetism, it is necessary to choose well the subject in whom you would produce cries, convulsions, dreams, and ecstacies. Only those practices are otherwise considerably more dangerous than the magnetism, for the former often end by developing *demono-mania.* We can conceive then easily, that a belief in good and evil genii was well calculated to strike with awe, feeble minds.

In the case of somnambulism, a person having been declared proper to exercise the magnetic influence, and for the rest, being inclined by his education to these corresponsive beliefs, familiarizes himself with the administration of the pretended magnetic fluid. Once his technical apprenticeship over, he commences the practice of magnetism, and after a short while, his simple appearance is sufficient to produce profound emotion. In every case, it is easy where one is of strong convictions, and where there are few with whom to deal; for generally it is a matter of no trouble to attract to those who are undecided.

Now this attitude, or that gesture, or these movements, are nothing more than artifice, by means of which there is developed in a person suitably prepared, a cerebral condition more or less decisive, and which can be carried even to that ecstacy which characterizes magnetic sleep. In this condition, moreover, much less frequently to be ob-

served than in simple lethargy, the belief or demi-belief has a power so wonderfully developed in the mind of the patient—of abstract images, of such an intensity, that all direct observation is entirely lost. *General sensibility* can even be annihilated in consequence of this profound interior absorption, and as the meditative organs commence again to exercise themselves on the products of abstract contemplation, the enrapt one can effect a series of ratiocinations sufficiently coherent; and the more, if the auditive impressions continue to operate, there can be established between the magnetiser and the magnetised a connection strongly marked; but in the case of the real ecstacy, the responses of the subject are as vague as those of the Sybil, and in the midst of his devotions the magnetiser interprets them always to the great admiration of his *coterie*.

The convulsive pheunomena explain themselves still more easily than do those of somnambulism. When we have studied the procedures of Mesmer, we know how it is that *natural* causes have produced these convulsions. If we wish to consider seriously the veritable cures performed by magnetizers, we will find that they have the same value as the cures of sympathetic medicine, and that cures are performed with magnetic fluid, as Phyrrhus cured ailments of the spleen by friction made with a *toe of the right foot*, an invention which he shares with Vespasian. The curative power of magnetizers is then a simple illusion, and therein we can here confront two classments of therapeutics which have for each other the greatest affinities. While the magnetiser cures one fluid with another, we have the Homœopaths, who cure the ideal of a disease with the ideal of a remedy. Moreover, nothing should excuse a general system of treatment which enforces, in persons of feeble mind, chimerical beliefs. So the proceedings of magnetisers should be proscribed in therapeutics at once as valueless, and as nuisances. The magnetic fluid administered in *one* day, they say, would be but a very small fraction of an universal fluid, by means of which there is

established (according to the theory of magnetisers) a mutual influence between the celestial, terrestrial, and animate bodies.

In going back to the beginning of abstract theories, we find a similar essence, which, under the same name, or that of *love of the world*, serves to bind again our human knowledge, and especially to quench that desire which would explain *all things*. The ease which one has, then, to deceive certain minds, relates not solely to the property which we have, to show without our internal emotions, under any sufficient influence; it rests on the profound scientific ignorance in which the mass of individuals are plunged.

In the phenomenon of the turning tables, we must believe that the table can turn without muscles, without nerves; that it can speak without the organ of voice. But all that is nothing by the side of the rapping-spirits, through the medium of which, every scientific opinion, even the very arches of mathematic phenomena, are shaken. That which contributes again in a great number of cases to the success—happily transient—of these fantastic exhibitions, is that it is not rare to encounter among these believers and propagators, persons instructed in the science. But that should only prove one thing, that judgment and common sense, are independent of literary and scientific attainments. Flint, and then Schiff, have indeed shown, in their experiments on the inventors of these juggleries, that the sounds which they produced, were due to a slight displacement (previously occasioned) of the patella—to the tibia on the femur—or to the tendon of the long peroneus, all jerked suddenly into proper position. This displacement is effected by muscular contractions which are easily acquired. Aided by this physiologic knowledge, it has been an easy matter to baffle their trumpery, by causing them to place the limb in a position, in which muscular contraction was impossible. As for this magnetic fluid, there exists nothing as we see, but an hypothesis denuded of all proof.

Finally, all that interest, which, according to some authors, should appertain to the physiologist, in the study of magnetism, rests in an habitual ignorance concerning the physiology of the brain—and reduces itself to this, that it is easy enough to place such or such an individual, at first, and then an assembly in whole or in part, in an intellectual condition such as the information more or less vague obtained, of the first, are interpreted by the other in the sense which is desired should be contrary to that to which attention has been directed. It is in such a cerebral condition that is to be found, the explanation of all the singular effects of magnetism, the abstractions occasioned by the juggleries which surround us—the changing effects following the practice of magnetism—all depende..t on the cerebral condition of the magnetised.—*Buffalo Medical and Surgical Journal.*

MONTHLY SUMMARY.

Animal Grafts.—A French naturalist, M. VULPIAN, cut off the tails of tadpoles, and saw them not only live but *grow* for ten days, indifferent to all theories of nervous centres, digestive apparatus, or circulatory systems. But the member that seems to have the strongest dose of the "vital principle," is the tail of a rat. The following experiment was made by Mr. BERT. He dried a rat's tail under the bell of an air pump, and in immediate proximity to concentrated sulphuric acid, so as gradually to deprive it of all moisture. Then he placed it in a hermetically sealed glass tube for five days. At the end of this time he subjected it for a number of hours to a temperature of 98 degrees centigrade in a stove, and subsequently sealed it a second time in his tube. Four days more having elapsed, he united this tail by its cut extremity, to the freshly cut stump of a living healthy rat, and quietly awaited the result. His success was as complete as it was marvellous. It commenced to expand and perform the natural duties of a tail, and three months afterwards, he demonstrated by a second amputation, and a careful injection, that it

was furnished with proper vessels and was a living part of the second rat!

What rich lessons practical surgery may learn from such experiments, can be imagined. A careful anatomist has transplanted a fragment of bone from the skull of one rabbit to the skull of another, and found it form adhesions and replace the lost portion perfectly. A piece of periosteum taken from a rabbit twenty-four hours after death, grew and produced bone when grafted neatly on a living animal of the same species. Nerves also have been removed from one body to another with success, and some very singular results noticed were a portion of a motor was excised and supplied by a fragment of a sensory filament. The disease to which grafted members are subject, after they have been exposed to certain reagents, are also full of hints for the pathologist and the physician.—*Med. and Surg. Reporter.*

The Prudent Live Longest.—In a very careful and laborious *Appendix to the Eighteenth Annual Report of the Prudential Assurance Company*, by HENRY HARBEN, Esq., is given the experience of the Company in the industrial branch for the years 1864, 1865, and 1866; and the author ingeniously compares the Company's statistics with those issued by the Registrar General. The experience is this: that among the artisan and small tradesmen class of lives, the numbers exposed to risk were in the proportion of 48.3 male to 51.7 female, in this respect assimilating to the proportions of the general population of England and Wales; that the rate of mortality during these three years was 21.67 per 1000 whereas, in all England and Wales it was 23.63 —the difference in favor of the Prudential Company being 1.96 per 1000. Since it is the most prudent of the working classes who insure their lives, these facts, brought prominently forward by Mr. HARBEN, tend to verefy the old saw, that "the prudent live longest."—*Brit. Med. Journal.*

New Lingual Muscle.—Bochdolek, Jr., describes a new small muscle of the tongue, extending longitudinally in the middle line between the two genio-hyo-glossi—*Reinhert und Du Bois Raymond's Archiv*, 1866, from *Journal Anatomy and Physiology*, No. II.

The Preservation of Sulphate of Iron.—Signor Pavisi recommends the following method of preserving sulphate of iron from oxidation. Mix four parts of pure crystallized sulphate of iron, and an equal quantity of finely powdered gum arabic, with distilled water, and evaporate the solution in a water bath, at a low heat, till it has a sufficient consistency to be poured out on plates of glass. When it has been poured out in this way, and allowed to dry at a temperature of 38° cent. in the dark, it may be cut up into lozenges, which can be kept for any length of time in a coloured stoppered bottle.—*London Lancet.*

Excretion of Urea.—The *American Journal of the Medical Sciences* for October, publishes a very clever inaugural thesis by Dr. T. R. Noyes, containing a record of experiments on four persons, to determine the effect of food, sleep and exercise in the excretion of urea. The first week the parties experimented on used a mixed diet; the second week they lived exclusively, on animal food, the third on purely vegetable food with the exception of a little milk in their bread, their tea and their coffee, while during the fourth week, the diet was the same as the third, but the subjects of the experiment took an unusual amount of exercise.

The first point noticed is that there is no immediate change in the excretion of urea after an alteration of diet, but that it requires three days to exhibit the full effect. Another fact made known in these experiments is that the old rule for estimating the proportional quantity of urea excreted, by the specific gravity of the urine, is by no means of universal application. As for diet, it was found that animal food increased the excretion of urea 169 per cent. but diminished the weight of the body. Free *uric acid* was detected, showing that the nitrogenous matter had not been all oxidated to urea. On changing to a vegetable diet the urea was diminished 75 per cent. Exercise slightly increased the quantity of urea, but marked increase was observed only as the result of fatigue.

Coffee increased the urea 14 per cent. To determine the influence of *sleep*, our author lay abed all day for a week, during which time, he found that he eliminated 31 per cent. more urea during the day than at night. The effect of mental occupation

is not so distinctly shown, but there appeared to be somewhat less urea excreted during active mental work than when the mind was at rest. The author discharged 2.41 per cent. more urea upon light reading than upon arithmetical calculations.

New Researches on the Cardiac Circulation of Animals.—Dr. JUDEE has just published a pamphlet on this subject. He shows that in frogs what is by common consent, called first movement, is compounded of the auricular portion and the dilatation of the ventricle, and the dilatration, *per contra* of the two auricles with which the heart of this batrachian is provided. In the second part of the book, relying not only on his own experiments on frogs, but on those made on horses by MM. CHAUVEAU and MAREY, M. JUDEE stated that these physiologists have taken for the commencement of the first movement, or systole, was nothing but the end of the second, or diastole of the heart. In other words, that the systole of the auricle does not form part of the systole of the ventricle, but of its diastole; so that, in fact, in the horse, at least, the cardiac revolution does not commence, as is generally supposed, by the systole of the heart, but by its diastole. When M. JUDEE compares this cardiac revolution to a measurement in three movements, he is led to admit: 1. That the first movement, or great silence, corresponds to the dilatation of the ventricle. 2. That the second and third movements are formed by the sounds of the heart separated one from the other by the short silence, during which the ventricle contracts itself.—*Brit. Med. Journal.*

A New Dentifrice.--Phenic, or as we more commonly call it, carbolic acid, would come into greater use were it a more manageable drug. A specimen of a phenol soap is offered, and is claimed to be of great use in skin diseases, while a perfumed phenol is presented, said to be a really delightful toilet water and dentifrice. The proportions used are ten grammes of the crystallized acid to a litre of water, with various aromas. When used as a dentifrice, a spoonful of this is added to a quart of water. The phenate of soda can be used with great success as an unguent (one part to ten of simple cerate) in parasitic affections and a comb dipped in a solution of it, and passed through the hair

is an efficient remedy in pityriasis, etc. Internally it has been administered by inhalation, by injection, and by the stomach. For the latter purpose a solution of one part in a thousand has been employed.—*Medical and Surgical Reporter.*

A Remarkable Invention.—Most people have a wish to preserve the bodies of deceased friends or relations from the changes of appearance by decay after death as long as possible. Though the eye has ceased to flash, the lips to move, or the voice to give response, we would fain have the clay tenement preserve its natural appearance.

To effect this object, a *perfectly air-tight* burial case has been invented, which has preserved a corpse at Bellevue Hospital for *three months.*

This burial-case, which certainly must supercede all others, is wonderfully simple in its construction, and is closed by means of a *single screw.—Med. and Surg. Reporter.*

Mr. Hoff and the New York Academy of Medicine.—At the last meeting of the Academy of Medicine, the following resolutions were unanimously adopted;

Whereas, W. L. Hoff, proprietor or agent of the "Hoff Malt Extract," is issuing publications through the secular papers, and by means of pamphlets and circulars professing to quote favourable opinions expressed in a report of a committee of the Academy;

And, Whereas, the said Hoff is widely circulating a letter purporting to have been written by a Fellow of this Academy;

And, Whereas, the publications of said Hoff are so adroitly and designedly worded as to impress the mind of the reader with the belief that the Acadamy has endorsed his nostrum, and has thus apparently compromised its dignity and professional standing—Therefore,

Resolved, That the New York Academy of Medicine does hereby proclaim and declare that it has not expressed any opinion in regard to "Hoff's Malt Extract," and that any and every use of its name in reccommending said Extract is unauthorized by the Academy.

Resolved, That a copy of the above preamble and resolutions

be sent to the Medical journals of this city, and that the Medical journals throughout the country be requested to publish the same in justice to the Academy and the profession.—*New York Med. Jour.*

A new Method of Resuscitation from Hyperanœsthesia by Chloroform.—At a recent meeting of the New York Academy of Medicine, Dr. Worster read a case in which chloroform had been administered to a patient, by a party whom he regarded as competent, as a preparatory step to an operation, by himself, for the relief of hæmorrhoids. Suddenly the patient had stertorous breathing, became pulseless, and exhibited all the symptoms of a speedy dissolution; but by the simple expedient of reversing his position, and inclining his body to an angle of forty-five degrees, he was fully restored.—*N. Y. Med. Record.*

BIBLIOGRAPHICAL NOTICES.

The Tree of Life; or Human Degeneracy; its Nature and Remedy. By Isaac Jennings, M. D. Publishers, Miller, Wood & Co., New York. A small treatise on the treatment of human life on Orthopathic principles, including directions for the treatment of human physical life. Part 1st. is devoted to Man's Spiritual Degeneracy; Part 2nd. to Man's Physical Degeneracy, its nature and remedy. We take the following from page 220:

"There are what may aptly be called critical periods in slender human life, from infancy to advanced age, growing out of new developements or essential changes called for at different stages of life's progress. Teething forms one of these changes." "After a few months, many children have trouble with their teeth, and the reason of it is obvious. Teeth cost something." "There must be a special outlay of vital force to bring them forward, and there is not enough in store in the depository pertaining to the group of organs concerned in teeth making for the purpose without curtailing appropriations to other organs; and these parts are thereby left so deficient in sustaining energy that they falter in their action; and this faltering is manifested by various phenomena called symptoms." "Patient and careful nursing is all that is called for on the part of the mother." "Keep the babe well covered with flannel, let it have the breast at suitable intervals, and as you value the future welfare of the child, eschew "Winslow's soothing syrup," and all such baby quieters. As the gum swells over a protruding tooth, it may be rubbed gently, occasionally, with any smooth hard substance, and as the tooth nears the surface, the gum over it may be divided."

A Dictionary of Medical Terminology, Dental Surgery, and the Collateral Sciences.—By Chapin A. Harris M.D., D.D.S. Third edition, carefully Revised and Enlarged, by Ferdinand J. S. Gorgas, M.D.,D.D.S.—Philadelphia, Lindsay and Blakiston, 1867.

Dr. Harris' Dictionary has been so long before the profession, and has been received with such universal favour that it is idle to say anything about its merits. It is not, however, irrelevant to inquire how the new edition differs from the old.

It may surprise some to see the announcement on the title page "Revised and *Enlarged*" and then to ascertain that the new edition contains only 743 pages while the old had 800. Yet in spite of the arithmetical anomoly, the title page tells the literal truth. It has now been twelve years since the second edition was issued from the press. In that time great changes have taken place. The rapid advance of all the sciences which have furnished terms to this book has necessarily rendered obsolete many of the words then in common use. These have been dropped, and room thus made for addition of others which the same advance has rendered absolutely necessary to express the received opinions of the day. A large amount of space has been gained by omiting many articles which had been copied from the author's "Principles and Practice of Dental Surgery," and substituting for them simple references to that volume. No one who pretends to possess a Dental library is without both these books, so that nothing is lost by this excision. By thus economizing space the Editor has been enabled to diminish the bulk by nearly sixty pages while he has enlarged its contents by two or three thousand words.

Dr. Gorgas has performed his task diligently, and conscientiously. In the comparison which we have been enabled to make of the two editions, we have not detected the omission of a single word which we deemed it important to retain. Nor does he appear to have committed the opposite fault, so tempting to an editor, of crowding in a number of terms of no practical value whatever, and only serving, like the countermarches of a skilful strategist, to make an imposing display and conceal the real poverty of his resources. On the contrary, the new words, as far as our observation goes, are legitimate terms, regularly if not frequently used. He has followed the progress of modern science and given us the last results of its terminology, so far as they have any bearing upon Dental Surgery. Of course, the minute technicalities of the allied sciences are not given; otherwise three such volumes as this would prove insufficient.

The typographical execution of the book is generally good. We have however, noticed a few errors both in typography and quantity, the latter probably due to the printer. P.

The Medical Gazette.—This new candidate for professional favour is published by A. Simpson and Co., No., 60 Duane Street, New York. We

have received the first number, dated September 28th. It is strictly speaking, a Medical newspaper, giving all items of intelligence likely to prove interesting to physicians, whether engaged or not in active practice. Besides these, it also contains letters of distinguished teachers of medicine, abstracts of proceedings of Societies, and Hospital reports.

We are very much pleased with this specimen number. The matter is interesting and valuable, and the mechanical getting up of the paper is unexceptionable. It is published at the very moderate sum of two dollars a year which ought to bring it within the means of the poorest.

EDITORIAL DEPARTMENT.

Medical Professors in Dental Colleges—Much idle clamour has been raised about medical professors in Dental Colleges, and some who favor certain institutions consider it a matter deserving of special commendation that they are officered exclusively by Dentists. The direct bearing of this fact upon their competency as instructors is not easy to perceive.

If this objection to medical professors rests upon any other foundation than a petty and unworthy jealousy, it must pre-suppose some fancied incapacity of a medical man to give proper instruction to dental students. Now this incapacity must depend either upon the nature of the studies themselves or the training of the physician who undertakes to direct them.

The former hypothesis will scarcely be conceded to be correct by those who are aware of the constant, persistent, and at length successful efforts of dentists to get their profession recognized as a speciality of medicine. It unquestionably requires a certain amount of strictly medical knowledge to prosecute it with success, and it is therefore perfectly right that it should be so regarded. There is therefore, nothing whatever in the nature of the studies to prevent a physician from being a suitable man to aid a dental student in acquiring a knowledge of his profession; unless it be supposed that a thorough study of an entire science disqualifies one for teaching a part of it. Upon this hypothesis, a professor could not be trusted to teach a boy algebra because he was thoroughly versed in mathematics, from the first four rules of arithmetic to the highest generalizations of the calculus.

What better reason then, have we for supposing that a medical man's training disqualifies him for the duties in question, for this is the only other supposable case? The chairs occupied by Doctors of Medicine in Dental Colleges are Therapeutics, Anatomy and Chemistry. Let us see how far a physician may be, from the fact that he is a graduate in physic, supposed incompetent to communicate information in those sciences. Chemistry, to begin with, is a general science of great scope and innumerable applications. It is notorious that many Medical schools have chosen for professors of this science gentlemen who never studied Medicine, for

the simple reason that they were the most competent teachers they could find. If then, in the wider field of general medical science, professors may be chosen who are not M.D's, why need the narrow range of dental surgery require a D.D.S. to teach its pupils? What is needed here is a general knowledge of chemistry, together with its special applications to the science and art of dentistry. Surely no one is better qualified to impart the former information than he who has made the science of chemistry a special study. As for the latter, any chemist, worthy of the name, ought, upon a very short notice, to get a complete knowledge of what is needed.

Anatomy, too, is a science of generalities, as well as specialities. Surely a man is not less capable of teaching the structure of the head and neck, because he has acquainted himself with that of the entire system. A thorough knowledge of all the nerves is not inimical to a particular acquaintance with the ramifications and connections of the fifth pair.

Can any thing more be said against the selection of a physician to teach Therapeutics? Here again the student wants general knolwedge. He desires some insight into the general principles of the healing art. Now shall he take, for this purpose, a dentist whose daily practice deals with only a few of the agents of the Materia Medica; or shall he select a physician who is constantly called upon to use them all, and who therefore has a far more extensive and practical knowledge of their virtues, their indications and their contra-indications? The statement of the question is its answer.

The truth is that the sole qualifications required in a teacher of any art or science, should be a thorough familiarity with what he professes to teach, and a good faculty of imparting the knowledge he possesses. Any other demands are idle, absurd and utterly irrelevant.

Interesting to Graduates of the Baltimore College of Dental Surgery.—We are pleased to announce that *Graduates of the Baltimore College of Dental Surgery* have the privilege of presenting themselves as candidates for the degree of Doctor of Medicine on attending *one session* of Medical Lectures in the Washington University School of Medicine of this city. In other words a diploma from the Baltimore Dental College is considered equivalent to one course of medical lectures in this Medical College. From the well-known ability and high standing in the medical profession of the gentlemen composing the Faculty of the Washington University, a faculty second to none in this country, we regard the above action as quite a compliment to the Baltimore College of Dental Surgery, and we know that many of the Alumni of the Baltimore Dental College will avail themselves of this opportunity for obtaining the degree of Doctor of Medicine.

Ratio of Deaths from Chloroform.—Dr. Andrews writes to the *Chicago Medical Examiner* an account of the mortality in the London Hospitals

from the use of chloroform, in which he corrects several alleged misstatements in Sansom's recent valuable contribution to the literature of Anæsthesia. The question is so important and so well treated by Dr. Andrews that we copy the greater portion of his letter. It must be borne in mind that these statistics are purely Surgical.

LONDON, July 13, 1867.

The London surgeons, with the exception of Dr. Protheroe Smith, and part of the officers of Guy's Hospital, have, with one consent, settled themselves down in the comfortable delusion that the risk of chloroform is scarcely worth considering. I find them just like Americans in one thing—they hate statistics. When I ask them what the actual risk of chloroformization is, they reply, "Oh, a very trifle, a mere nothing." The celebrated Mr. Simon, of Guy's Hospital, told me that it was in his opinion safer to take chloroform than to ride on a railroad car. Others, when pressed for an opinion, generally fall back on Mr. Sansom's Handbook on Chloroform, which estimates the deaths from Chloroform to be only one out of every 17,000 persons taking it. This may be set down as the opinion of the mass of London surgeons, both eminent and otherwise. Now, while they are gliding along in this agreeable state of mind, I have been at work to gather facts, and I find that instead of one death in 17,000, one patient dies out of every 3,461 anesthetized, in the very hospitals where these gentleman are at work. In other words, the deaths from chloroform under their own hands are about five times as numerous as they state, and as Mr. Sansom's Handbook estimates. If there were a railroad in London which killed one out of every 3,461 of its passengers I imagine one would hesitate to buy a ticket on it. In examining Mr. Sansom's statistics, to see how he arrives at his surprising estimate, I find the reason of his error. He omits entirely the London hospitals, and takes no note of the fact that several deaths from chlorororm occurred in the very one of which he was an officer. He obtains from some source an estimate of the number of times the article had been given in the hospitals of Birmingham, and other inland cities, amounting in all to 17,000 times. In these hospitals only one death from its use had "been reported," *ergo* chloroform causes only one death in 17,000 cases. Now, the very first step which I made in this investigation showed me that many deaths from anesthetics occur both in this country and America, which are never publicly reported, There are no regular statistics of anesthesia kept in any hospital here, that I have yet found, and as a chloroform death is an ugly uncomfortable fact, it usually slumbers unnoticed by the records. The difficulties of my investigation, therefore, have been very great. My mode of obtaining the facts had been this. I have made careful personal inquiries of the surgeons, house surgeons, dressers, secretaries of every hospital which I have visited, as to the two points, viz.: the number of times per annum chloroform has been given, as far back as their means of information extend, and, secondly, the number of deaths it has occasioned in the

same period. These officers usually have no difficulty in estimating approximately the number of administrations per annum which have occured for several years, and the deaths during the same periods. In this way I have collected figures from fourteen hospitals in Liverpool and London. I obtained reliable accounts of chloroform being adminstered eighty-three thousand and fifty-nine times, (83,059,) and of these, twenty-four (24) proved fatal, or one in three thousand four hundred and sixty-one, (3,461.) Now if this is "safer than riding on a railroad," then I shall buy no more railroad tickets. A railroad in active business which should have a mortality like this would kill from 500 to 3,000 passengers every year, I shall continue my investigations on this subject both here and in France, and will report any new facts which I may ascertain Some of the hospitals here are a little uneasy, after all, and are using a new inhaler for safety, called Clover's apparatus, the principle of which is to inhale from a large air sack, which is inflated by a bellows, of a known capacity. The air, in passing from the bellows, goes through a hot evaporator, containing just enough chloroform by measure to give 3 or 3½ per cent. of chloroform vapor to the air in the sack. The huge, black bag, about 3 feet long and 2½ feet wide, is slung on the back of an assistant, looking like the burden in the pictures on the back of Bunyan's Pilgrim. A large tube passes under his arm, terminated by an inhaler so arranged with valves that the patient inspires from the bag and expires into the open air. It is too clumsy for private practice, but works well in hospital, and probably promotes safety, as the patient cannot possibly get more than the per cent. of chloroform vapor which is placed in the sac. It has not been used enough yet to test, practically, the per cent. of mortality under it.

The Persimmon.—This old friend of our boyhood, that served our infant mouths so many shabby tricks, by pretending to be ripe when it was not, and then set us to premature and painful whistling, has lately come out as a first class astringent. Every boy, we are sure, will endorse it for that. Dr. Mettauer, a well known physician and surgeon of Prince Edward County Virginia, has been discoursing on its value in the *Boston Medical and Surgical Journal.* The unripe fruit is used in the form of tincture, syrup, or infusion. Good results have been obtained from it in Cholera infantum, diarrhea, dysentery, menorrhagia, gleet, bronchorrhœa and coryza. The Doctor says that mixed with rhubarb, it is a good vermifuge.

Obituary.—As we go to press we are pained to learn of the death of Dr. Decatur P. Gregg of Columbia, S. C. Dr. Gregg was a graduate of the class of 1853, and was for a long time in successful practice at Charlotte, N. C. Of late years Dr. Gregg has been a resident of Columbia, S. C., where he was much respected for his high moral as well as professional worth. Dr. Gregg had been appointed one of the "Harris Lecturers" for the present session of the Baltimore College of Dental Surgery.

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United States Lathe complete	$22 00
Chevalier's Standard	18 00
Amateur's Lathe for Polishing, Turning and Drilling, very complete	35 00
Lodge's Lathe, strong iron frame with shears, movable head chucks, &c.	60 00
Empire Lathe, a splendid article	40 00
Hand and Foot Lathe	$10 00
Hand Fly Wheel, (new)	6 50
Hand Lathe, two spindles	6 50
" " one "	4 50
" " two " enclosed wheel	6 00
" " two " " "	4 00
" " skeleton	2 50

DENTAL INSTRUMENTS.

A very large assortment of Dental Instruments of the standard makes, including Chevaliers', Kern, Gemrig and others, comprising Forceps of nearly one hundred different patterns, Stump Elevators, Screws, Hooks and Punches, ebony and ivory handles, Lancets, Plugging Instruments, Scalers, Excavators, Burs, Drills, etc., etc.

T. G. ARMSTRONG & SON.

No. 520 Arch St., Philadelphia, and 1105 Main St., Richmond, Va.

ANATOMICAL PREPARATIONS.

First and second dentition, up. and lower maxilla, (mounted,) with vase...$15 00

Upper and lower maxilla, carved, exhibiting artery and vein on one side, and nerve and artery on the other, (mounted,) with vase................ 30 00

Comparison of the angle of the lower jaw in the infant and adult, (mounted,) with vase.. 9 50

Comparison of the arch of the upper jaw in the infant and the adult, (mounted,) without vase... 9 50

SKULLS, No. 1... 12 50

" No. 2... 9 00

" No. 3... 7 50

Anatomical Illustration of the Fifth Nerve,

DRAWING LIFE SIZE AND WELL COLORED.

Plate 21 x 27 inches...$3 00

DENTAL CASES.

No 1.

5 Drawers, 2 Trays, Pearl or Cameo-handles Gold Ferruled Instruments, Hand Mirror, Mouth Glasses, Foil Shears and Gum Lancet, all pearl handles and gold mounted; extra quality Octagon Joints Forceps, and all the other instruments, in very superior styles and finish. Complete..$280 00

As above, but plainer Instruments..$250 00

No 2.

Fine Rosewood Case, with drawer for Forceps, and tray divided into compartments for Foil Files, Teeth, &c. Same styles of Instruments described above, $200 00

No. 3.

Fine Rosewood Case, Instruments as above...$175 00

No. 4.

Rosewood Case, Instruments ivory handles and silver ferruled, pearl works, silver mounted...$140 00

No. 5.

Brass Bound Mahogany Case, fluted handled instruments, pearl work, silver mounted...$100 00

No. 6.

Brass Bound Case, fluted handle instruments, pearl work, silver mounted, $85 00

No. 7.

Brass bound Mahogany Case, with two trays. Complete with Instruments, $70 00

No. 8.

Same as No. 7...$60 00

No. 9.

Brass bound Mahogany Case, one tray..$50 00

No. 10.

Neat Mahogany Case, contains—
- 6 bone handle Scalers, no ferules.
- 12 steel " Pluggers.
- 1 Gum Lancet.
- 1 Mouth Glass.
- 1 Socket Handle.
- 2 doz. Drills and Excavators to fit Socket.
- 1 pair upper molar Forceps.
- 1 " lower " "
- 1 " straight.
- 1 " roots.
- 2 Elevators..$40 00

T. G. ARMSTRONG & SON.

No. 520 Arch St., Philadelphia, and 1105 Main St., Richmond, Va.

GAS APPARATUS.

We keep on hand a full supply of Gasometers and all the popular apparatus for making and administering the Nitrous Oxide Gas, with latest improvements in Inhaling Tubes, &c., &c.

Ether Spray or Rhigolene Instruments,

FOR PRODUCING LOCAL ANÆSTHESIA,

With Double Tubes, several varieties, price	$6 00
Rigoline, per pint bottle	1 00

BRUSH WHEELS.

Cotton or Buff Wheels	from 15 cts. to $1 00
Brush Wheels	" 15 " 1 00
Felt Wheels for finishing Rubber	" 15 " 50

N. B.—Please state in ordering Wheels, number of rows of bristles in width, diameter, shape, and whether hard or soft are required.

ARKANSAS, WASHITA AND SCOTCH STONES,

All shapes and sizes, from ....25 cts. to $3 00

PLASTER OF PARIS.

EXPRESSLY FOR DENTAL PURPOSES.

Per quart	$ 08
" barrel	4 75

CORUNDUM WHEELS.

Corrundum Wheels, from	6 cts. to $1 00
" Cones for Lathe	12
" Files, Round, Taper and Flat Oval	25
" Slabs	38
" Tape, per piece	8
Buck Horn Tape "	8

TOOTH POWDER BOXES.

Paper, fancy colors and gilt, tin foil lined per doz	$ 50
Wood, varnished, "	50
Glass, with Metallic Lids	1 50
" " Glass Lids	1 75

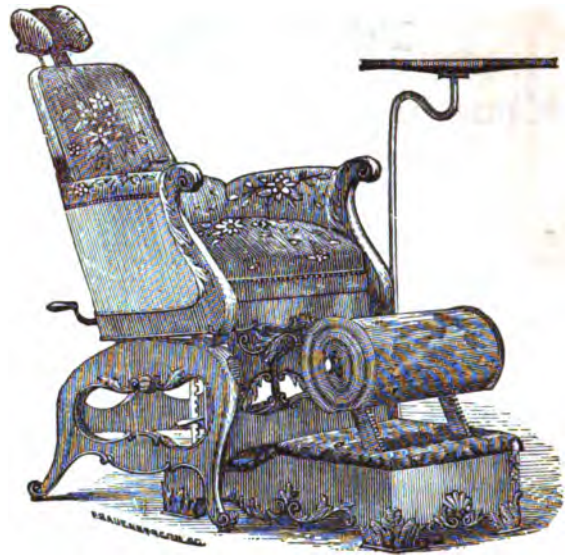
BLOW PIPES.

Condensing Blow Pipe	$25 00
Self-acting "	6 00
" "	4 00
Brass, Screw Joint, "	1 00
" with bulb "	85
" heavy 11 inch "	50
" " 13 " "	55
" " 15 " "	60
" " 9 " "	20

T. G. ARMSTRONG & SON.

No. 520 Arch St., Philadelphia, and 1105 Main St., Richmond, Va.

ARCHER'S IMPROVED DENTAL CHAIR.



PRICE LIST OF CHAIRS.

No. OO—Is made of Walnut or Cherry, and upholstered in good style, with a moveable head-piece like the best chairs, but with a stationary seat and back. Covered with plush. PRICE $32. Covered with enameled cloth, PRICE $27.

No. O—Is made of Walnut or Cherry, and upholstered in good style, with a moveable head-piece and falling back, (on the same principle as the one shown in the engraving,) but with a stationary seat. Covered with plush, Price $45. Covered with enameled cloth, PRICE $40.

No. 1—Is made of Walnut or Cherry, and upholstered in good style, and with all the movements complete. It is covered with reps or enameled cloth, PRICE $50.

No. 2—Is a very handsome Black Walnut or Mahogany, or imitation Rosewood frame, with all the movements like the chair shown in the cut. It is made with flaring arms, making the seat wide enough for the convenience of any patient. The price of this chair is unusually low for one so well finished in every respect. We sell more of this chair than all the others combined. PRICE WALNUT, OAK, (or imitation Rosewood,) $60. MAHOGANY, $63. And with swan neck arms instead of plain arms, $1 extra.

No. 3—Is made of the best quality of Black Walnut or Mahogany, and splendidly carved and covered with the best quality of Moquette or plush. It has flaring arms, carved in imitation of a swan's neck and head, making a very handsome chair. Price of either Walnut or Mahogany, $90.

No 4—Is made of solid Rosewood splendidly carved, upholstered in the very best manner and covered with the best quality of plush, inside and outside alike, and with or without silver headed nails. The seat is raised by means of a silver-plated wheel instead of crank, and the brass work is silver-plated. It is in all respects the most elegant chair in use. PRICE $125. Mahogany ar Walnut, same style and finish, $110,

Any of the above chairs, (except No. 4,) upholstered with silver nails, $2 extra.

JUSTI & CO.

No. 616 Arch Street, Philadelphia.

No. 1.

No. 2.

SPITTOONS.

No. 1.—"A" is the standard to be attached to the lower part of the chair which remains firm when the upper part of the chair is thrown back. "B" is the ring attached by a strong bolt to the top of the standard on which it can be moved so as to throw the spittoon either towards the front or the back of the chair. "C" is the marble top. "D" the glass funnel, and "E" the bowl with which the funnel can be readily removed to be cleansed. The iron work is handsomely bronzed, and in every respect is very ornamental and very durable and convenient. PRICE $8.

No. 2—Is made of Mahogany or Walnut, or imitation Rosewood, with marble top and heavy claret colored glass funnel and inside bowl complete. The bowl lifts out from the top the same as number one. PRICE $11. The same of Rosewood, $13.

Heavy claret-colored glass spittoon funnels One Dollar each.

FOOT STOOLS.

The foot stool (as shown in the cut) is acknowledged by all to be the most convenient of any in use. It raises and lowers to suit the rise and fall of the seat.

No. 1.—Plain Walnut, covered with Ingrain carpet. PRICE $11.

No. 2.—Made of Mahogany or Walnut, or imitation Rosewood, covered with Brussels carpet. PRICE $13.

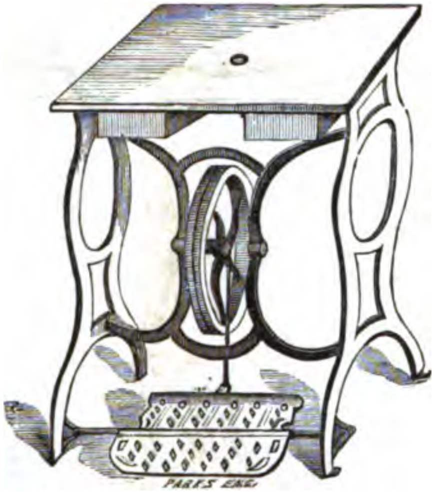
No. 3.—Made of Mahogany or Walnut, handsomely carved and covered with Velvet carpet. PRICE $20.

No. 4.—Rosewood handsomely carved and covered with the best Velvet carpet. PRICE $25.

JUSTI & CO.

No. 516 Arch Street, Philadelphia.

NEW LATHE,
HEEL AND TOE LATHE.

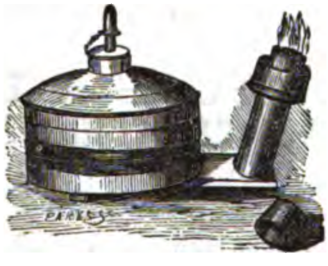


This Lathe is designed for those who wish to sit down to work, and runs very light. It has a broad treadle to accommodate both feet, and works with the heel or toe; is neatly painted and bronzed; easily put up or taken down; the top is of walnut, 16x20 inches and has two drawers.

Price of Stand without Head	$15 00
" with plain Head	21 00
" " U. S. Table Head	22 00
" " Diamond Lathe Head	23 00
" " Socket Head	24 00

SNOWDEN & COWMAN.

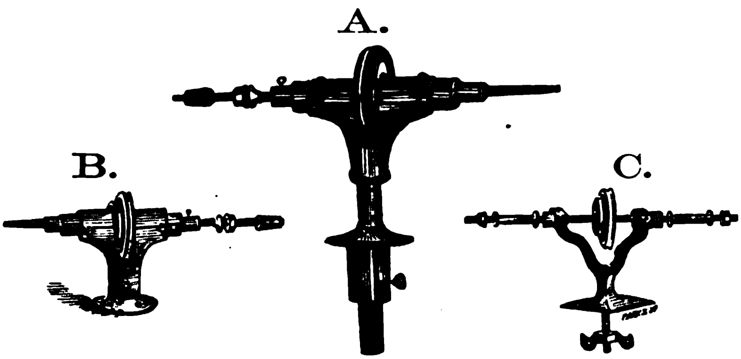
SOLDERING LAMPS.



We manufacture a non-explosive Soldering Lamp which has been very popular and gives great satisfaction. PRICE, 90 cents each.

SNOWDEN & COWMAN,
No. 82 West Fayette Street, Baltimore.

TABLE HEADS.



A.—SOCKET HEAD.—The socket screws to the table, has a set screw in the lower part, the head slides four inches to tighten the strap or vary the height from the table..PRICE $12.00

B.—U. S. LATHE HEAD, with holes in the base to screw to any table ....PRICE $10.00

C —DIAMOND LATHE HEAD.—The head, pulley, and spools, which retain the wheels and brushes, are of brass. The spindle is of the best unannealed hammered steel, and of the size to suit the holes in the wheels............PRICE, $10.00

SNOWDEN & COWMAN.

FLASK PRESS.

This Press is intended to close the flask together after packing with rubber, thereby saving the screws of the flask—it is of great advantage, saving screws and flasks. PRICE $2 00.

SNOWDEN & COWMAN,
No. 82 West Fayette Street, Baltimore.

VULCANIZERS.

No. 1 Vulcanizer.

This Vulcanizer is made of very heavy copper and thick brass top. It will bear four times the pressure required. Can be closed or opened in a minute, hot or cold, it is tinned inside to prevent the action of the sulphur on the copper; is adapted to any flasks in the market. Will hold two flasks of our old style or three of any other make. Heated by gas or kerosene oil. PRICE $20 00.

No. 2 Vulcanizer.

With flat brass top, tinned inside; will take any flask except our old style flasks and is equal in strength or durability to any Vulcanizer in the market. It will bear twice the pressure required. PRICE $16 25.

THERMOMETER.

Especial pains has been taken with the thermometers to have them accurate, and if broken they are easily repaired. PRICE $2 00.

2 Flasks, iron, 87½ cts. each	$1 75	Jacket	$ 30
Wrench	10	Alcohol Lamp	2 50
Gas or Kerosene Stove	2 50	Thermometer tubes & scales, each	1 00

SNOWDEN & COWMAN,

No. 82 West Fayette Street, Baltimore.

PORTABLE HEAD RESTS.

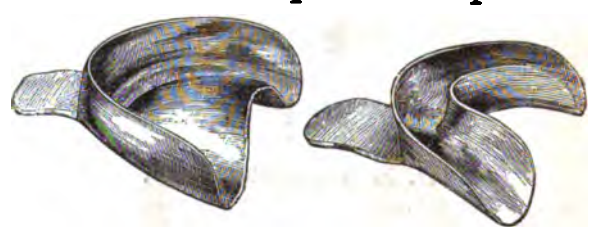
No. 1.

No. 2.

No. 1.—This head rest can be attached to any chair, can be packed in a small space, and is very simple and light. PRICE $6.25.

No. 2 is a new Head Rest, can be attached to any chair, is very firm, and can be raised, lowered or moved backward or forward without interfering with the attachment to the chair. It weighs only 4 lbs., and occupies a space only of 13 x 4 inches. PRICE $7.50.

Britania Impression Cups.



We manufacture the following sizes and varieties of Britania Impression Cups:

Upper, Nos. 1, 2, 3, 4, 5, 6, 7.
Lower, " 1, 2, 3, 4, 5.

PARTIAL CUPS.

Enclosed cavity, Nos. 9, 10, 11.
Open " " 6, 7, 8.

PRICE, $6.00 per dozen.

SNOWDEN & COWMAN,

No. 82 West Fayette Street, Baltimore.

Gasometer for holding and preserving the gas any length of time.

We are manufacturing gasometers of three sizes, of a very convenient form. They are made of zinc, in the best manner, with iron pipes, inside, and iron gallows to support the gas holder—the gas holder is readily taken down or put up A No. 1 Gasometer, 30 gallons, occupies a box 30 x 24 inches. They look well in the operating room, or can be put up in any other room more suitable, as they are neatly painted and bronzed.

A MOUTH PIECE OR BREATHING TUBE.

is a hard rubber stop-cock with two valves, one for inhaling the gas, the other for breathing into the air. The several parts are connected by rubber pipes.

PRICE OF THE APPARATUS COMPLETE.

No. 1 holds 30 gallons	$45 00
No. 2 holds 40 gallons	50 00
No. 3 holds 50 gallons	55 00

No charge for boxing.

NIT. AMMONIA.

10 pounds, in Jars	$6 50
20 pounds, in Jars	13 00
Per pound	70

RETORTS.

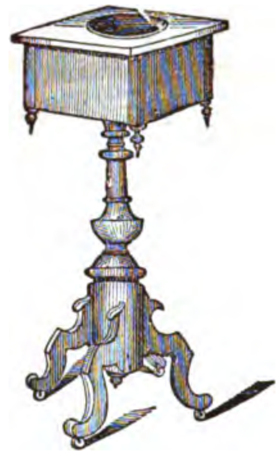
Glass Retorts, per doz	$6 00
Glass Retorts, each.	60

Boxing extra.

SNOWDEN & COWMAN,

No. 82. West Fayette Street, Baltimore.

SPITTOONS.



MAHOGANY OR WALNUT.

Square marble top, drops pending from each corner, turned pillar, feet on rollers.

PRICE, $17.50.

FOOTSTOOLS.

With cylinder to raise and lower, covered with Brussels carpet, price........$15 00
Covered with ingrain carpet.. 13 50
A very neat footstool, with steps covered with Brussels carpet, as per cut... 10 00

DENTAL CHAIRS.

We are manufacturing a handsome DENTAL CHAIR, that has no superior in the market for the price. It is made of walnut, upholstered in fine plush, with plated nails, silver plated head rest, and has all the movements. This chair has been very much admired and gives entire satisfaction.

Price...$90 00
" In rept.. 80 00
Iron head rest bronzed.. 10 00 less.

SNOWDEN & COWMAN,
No. 82 West Fayette Street, Baltimore.

TOOTH-POWDER BOXES.

Paper, fancy colors and Gilt lined with Tin Foil	per doz	60
Wood, No. 1, varnished	"	45
Wood, No. 2, varnished	"	50
" No. 3, "	"	60
" No. 4, "	"	70
Glass with metalic Tops	"	1 25
" " Glass Lids	"	2 00
" " " " Small	"	1 25

AUSTEN'S MOULDING RINGS

Consists of four rings in a nest, requiring but little sand. Price 75 cts. per nest.

CORUNDUM WHEELS, Etc.

No. 00	each	7
No. 0	"	9
No. 1, ⅛ inch thick and under	"	12
No. 2, ⅛ " " " "	"	16
No. 3, ⅛ " " " "	"	20
No. 4, ⅛ " " " "	"	25
No. 5, ⅛ " " " "	"	30
No. 6, ⅛ " " " "	"	40
No. 7, ⅛ " " " "	"	60
No. 8, ⅛ " " " "	"	1 00
No. 9, ⅛ " " " "	"	2 00
No. 10, ⅛ " " " "	"	3 00
Corundum Cones	"	20
" Cups, small	"	30
" " larger	"	40
" Files, Round, Taper and Flat oval	"	30
" Slabs	"	30 to 60
" Tape, in two yard lengths	"	10

FELT WHEELS.

No. 1, 1¼ inch diameter ⅜ inch thick	each	15
No. 2, 1½ " " ⅜ "	"	20
No. 3, 2 " " ⅜ "	"	30
No. 4, ½ " " ⅜ "	"	35
No. 5, 2 " " ⅜ "	"	40
No. 6, 2½ " " ⅜ "	"	50
No. 7, 2½ " " ⅜ "	"	40

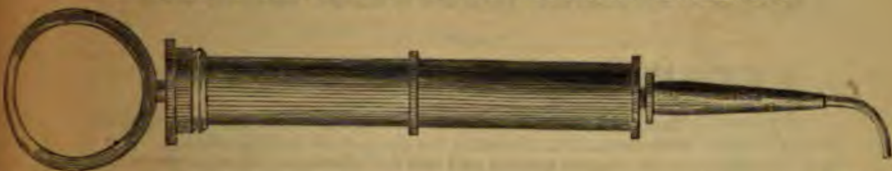
BRUSH WHEELS.

Cotton or Buff Wheels	each	15 to 90
Brush Wheels, *large variety*	"	15 to 90

SNOWDEN & COWMAN,

No. 92 West Fayette Street, Baltimore.

DENTAL SYRINGES.



Gold	$15 00
Gilt	6 00
Silver	5 00
" Plated	3 50
Gutta Percha.......75 cts to	1 00
White Metal Silver Point	75
Glass	25

SPRAY APPARATUS for producing Local Anæthesia.

Manufactured by CODMAN & SHURTLEFF.

Apparatus with one bifurcated double jet straight tube	$6 00
Apparatus with two curved double jet tubes instead of straight	9 00
Apparatus with one single jet tube, for surgeons use	5 00
Price of double jet tubes, each	3 00
Price of single jet tubes, each	2 00
Rhigolene, best quality, per 12 oz. bottles	1 00
Concentrated Sulphuric Ether, 1 lb bottles	2 00

SNOWDEN & COWMAN.

Apparatus for Local Anæsthesia or "Spray Instruments."

Testimony is abundant to show that the apparatus as made by ourselves for use upon the principle of Dr. Richardson—but not after his plan—though simpler and less expensive than other kinds is *the best hitherto constructed*, for the uses of Dentists, Physicians and Surgeons.

Every instrument is made in the most careful manner, and furnished with patented tubes and regulator.

Tubes will be furnished separately if desired and will fit most of the Bulbs in use, without alteration.

Descriptive circulars with price list may be had on application, and apparatus may be procured of ourselves or at most of the Dental depots.

CODMAN & SHURTLEFF,

Makers & Dealers in Dental Instuments & Materials,

No. 13 TREMONT STREET, BOSTON.

ARTIFICIAL TEETH.

PRIZE MEDAL

AWARDED TO

JOHNSON & LUND,

AT THE

World's Fair in Prussia,

1865,

FOR EXCELLENCE IN THE MANUFACTURE OF ARTIFICIAL TEETH.

The attention of Dentists is called to our late patterns of

BLOCK TEETH FOR RUBBER BASE.

In claiming for them

BEAUTY, NATURAL APPEARANCE AND TOUGHNESS,

We are endorsed by all who have given them a trial, as well as by the fact that we have just received a PRIZE MEDAL at the World's Fair in Prussia, for excellence in the manufacture of Artificial Teeth.

Our assortment of Block Teeth for Rubber Base is quite varied.

PRICES.

Blocks or Sections for Rubber Base	20 cents.
Single Gum Teeth, " "	20 "
" " " Plate Work	20 "
Plain Teeth, for Plate Work	10 "
" " for Rubber Work	10 "
Pivot Teeth	8 "

NOTICE.

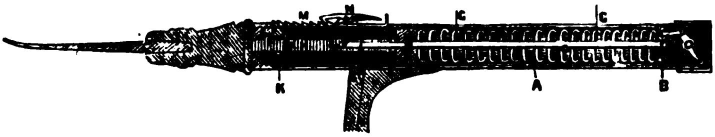
Our Teeth for Rubber work have DOUBLE-HEADED PINS. These are distinct and well formed. One of them is really inserted IN the tooth, the other is at the extremity of the pin, OUTSIDE. We thus secure a firm resistance in the body of the tooth, and ample space for the retention of the rubber around the pin outside. Our customers pronounce them "Excelsior."

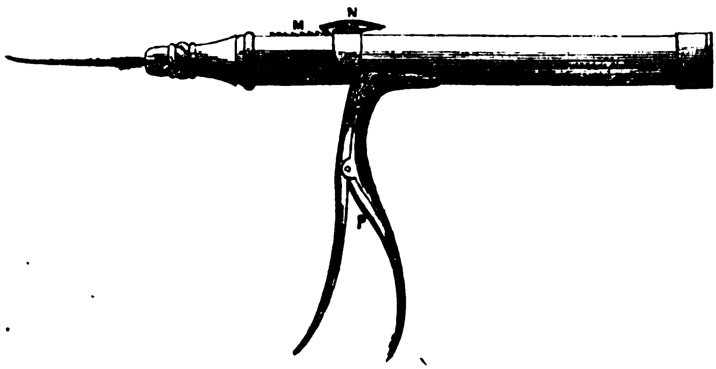
A liberal discount made to wholesale dealers.

JOHNSON & LUND.


J&L

TAYLORS' PRESSURE AND MALLET PLUGGER.





Of which the above cut gives a perspective and vertical view. H represents revolving socket and shaft which extends up to the face of the hammer A. L L represents screw which retains the socket in its place and forms the base of rubber spring K. By the use of rubber spring K the full effect of the blow is obtained without drawing the body of the instrument after it, and by the same spring the point is instantaneously relieved, so that sensitive teeth can be filled with less pain than by any other method.

A A represents hammer with wooden face and shaft of same. D double joint connecting hammer with crotchet C. E upright rod with hook on same passing over crotchet C, and extending down to lever handle F. By closing of lever handle the hammer is raised, and the upright rod slips off crotchet C. It is readjusted by the steel spring P on lever handle, forcing it open and raising hook on upright rod over the crotchet C.

The force of blow is obtained by weight of hammer A A and spiral spring G G, and is regulated by collar B and upright rods O, O, connected with ring and hook N. By sliding hook N on notches M the effect of the blow can be increased or diminished eleven different degrees.

This instrument was exhibited at the American Dental Convention held in Cincinnati in August last, and was acceded to be *far superior* to any other.

The Michigan State Dental Convention held at Detroit, Oct. 8th, passed the following resolution:

RESOLVED—That we highly approve of the Automatic Mallet presented before this Association by Dr. S. C. Taylor of Toledo; that we believe it is well adapted to the purpose for which it is designed, and in many respects is superior to any other in use, and that we as a convention, return him our hearty thanks.

Mallet Plugger, German Silver, heavily plated..............	$20 00
Point Holder and Loosener..................................	4 00
Case Turkey Morocco	2 50
One doz. Points..	3 50
	$30 00

☞ Full Set Points contains 4 doz. at $3.50 per doz.

(Patent applied for.) All Orders will receive prompt attention.

Address S. C. TAYLOR,

No. 181 Summit Street, Toledo, Ohio.

DECEMBER, 1867.

THE AMERICAN JOURNAL OF DENTAL SCIENCE,

EDITED BY

A. SNOWDEN PIGGOT, M.D.,

AND

F. J. S. GORGAS, M.D., D.D.S.

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SNOWDEN & COWMAN.

LONDON:

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1867.

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Communications intended for publication, and exchange journals and papers, should be addressed to the EDITORS OF THE JOURNAL, Baltimore, Md. All letters relating to the business of the Journal, or containing cash remittances, to be directed to Messrs. SNOWDEN & COWMAN. Articles for publication should be received by the editors at least three weeks previous to the first day of the month on which the number in which it is designed for them to appear, is issued.

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EDITORIAL DEPARTMENT.

THE
AMERICAN JOURNAL
OF
DENTAL SCIENCE.

Vol. I. THIRD SERIES—DECEMBER, 1867. No. 8.

ORIGINAL COMMUNICATIONS.

ARTICLE I.

A New System of Artificial Palates.

By Dr. Wilhelm Suersen, Sr., Berlin, Prussia.

(Provisional Extracts from a Lecture "On the restoration of a distinct utterance by means of a new system of artificial palates to be employed in cases of congenital and acquired defects of the palatine organs." Held at Hamburg on the 5th of August, 1867, at the 6th Annual Meeting of the Central Association of German Dentists. A short sketch extracted from the report on the sitting of the above-named meeting.)

The theory of the formation of sounds, which forms the basis of my system, may be set forth in a few simple propositions. These propositions are based on the works of Merkel and Brucke, especially on that of the last-named author.*

---

*"Anatomie und Physiologie des menschlichen Stimm- und Sprachorgans von Dr. Carl Ludwig Merkel." Leipzig, 1863, und "Grundzuge der Physiologie der Lautbildung von Professor Dr. Ernst Brucke." Wien, 1856.

The complete stenographic report, containing the exact description of the technical manipulations, is now printing, and will first be published in the organ of the above-mentioned association: "German Quarterly Journal for Dentology."

1. The air, having passed through the larynx and communicated verberations to the chordæ vocales, (which produces the sound,) finds at this point two ways open to it: the one leading below the velum palati through the cavity of the mouth; the other above the velum palati through the cavity of the nose.

2. The nasal sound arises: whenever the air current finds no impediment to its entering the cavity of the nose, and in this respect it is quite indifferent, whether the air can freely issue from here through the nostrils, or whether, while the nostrils are closed, it is made to reverberate only within the cavity of the nose. In proof of the first proposition Brucke (l. c.) states a simple experiment: "Hold a feebly burning light, (say a wax-taper) before the face, in such a manner, that the flame may be met by the breath issuing from the nose, but not by that from the mouth. Then pronounce a pure vowel (*a* for instance) without a nasal sound, and the flame will remain entirely unmoved. But it will at once begin to flutter, when you pronounce the same vowel with a nasal sound."

3. All letters, with the sole exception of *m* and *n*, (to wit in German,) may be pronounced both with and without a nasal sound.

4. The two letters *m* and *n*, on the other hand, can be pronounced only through the nose; in pronouncing the former letter, we close the gates of the lips, in pronouncing the latter, we shut the tongue-gate.

5. In order to be able to pronounce all letters distinctly, it is accordingly, necessary, (besides other conditions, which are far away from our present subject) to separate the cavity of the mouth from the cavity of the nose by means of muscular motion.

6. That separation is, under normal conditions, effected: on the one hand, by the velum palati, which strains itself (consequently by the levator and tensor palati;) but on the other hand, also by a muscle, which, to my knowledge has in connection with these operations

not yet received a sufficient amount of attention—I mean the *constrictor pharyngeus superior.* This muscle contracts itself, during the utterance of every letter pronounced without a nasal sound, just as the levator palati does. The constrictor muscle contracts the cavum pharyngo-palatinum, the pharynx-wall bulging out—and it is chiefly on the action of this muscle that I base the system of my artificial palates.

7. These palates, which in all their parts are made of hard caoutchouc, consist of a teeth plate suitably attached to existing teeth and which, at the same time, covers the fissure in the hard palate (if such a fissure exists). Where the fissure commences in the velum, that plate terminates in an apophysis broad enough for filling up the defect. This apophysis is at the same time of such thickness as to keep up a contact between the high edges forming the sides of the apophysis and the two halves of the velum even when the levator palati is in activity. To bring about this contact the more surely, the high edges forming the sides do not rise straight, but obliquely towards the outside. The lower surface of the apophysis, turned towards the mouth lies on about an equal level with the velum, *if the latter is raised by the levator palati.* But when the velum hangs losely downwards, the back part of the artificial palate is lying over it. This back part, accordingly, fills up the cavum pharyngo-palatinum, and in such a manner as not to impede the entrance of the air into the cavity of the nose when the constrictor pharyngous superior is inactive. Thus the patients can without any impediment breathe through the nose. But as soon as the constrictor contracts the cavum pharyngo-palati (this happens, as I will repeat for the sake of clearness, in the utterance of every letter, with the exception of *m* and *n*) the muscle already named reclines against the vertical back-surfaces of the obturator. By this operation the air-current is prevented from entering the cavity of the nose and compelled

to take its way through the mouth and thus the utterance loses its nasal sound. To the existence of those vertical surfaces, and consequently to the thickness of that part of my palates, which fills up the fissure in the soft palate and the cavum pharyngo-palatinum I must attach special importance. But for that thickness, the levator palati, when it rises upwards, would not remain in contact with the side-edges of the obturator, nor would the constrictor pharyngeus be able to effect a sufficient termination if the portion of the obturator nearest to it consisted only of a thin plate."

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Still more enthusiastic, if possible are the acclamations when the third patient, Mrs. A., about 30 years of age and also suffering from an acquired defect of the soft palate, is presented to the auditors. This patient is without the apparatus hardly intelligible, even to those sitting nearest to her whereas with the help of it her utterance is absolutely normal and regular.

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By a unanimous resolution of the meeting the princi-

pal prize, the great golden medal, was awarded to the lecturer.

Explanation of the Illustrations to the Lecture of Dr. Wilhelm Suersen, Sr.

Illustration I. Case of an acquired defect of the soft palate.

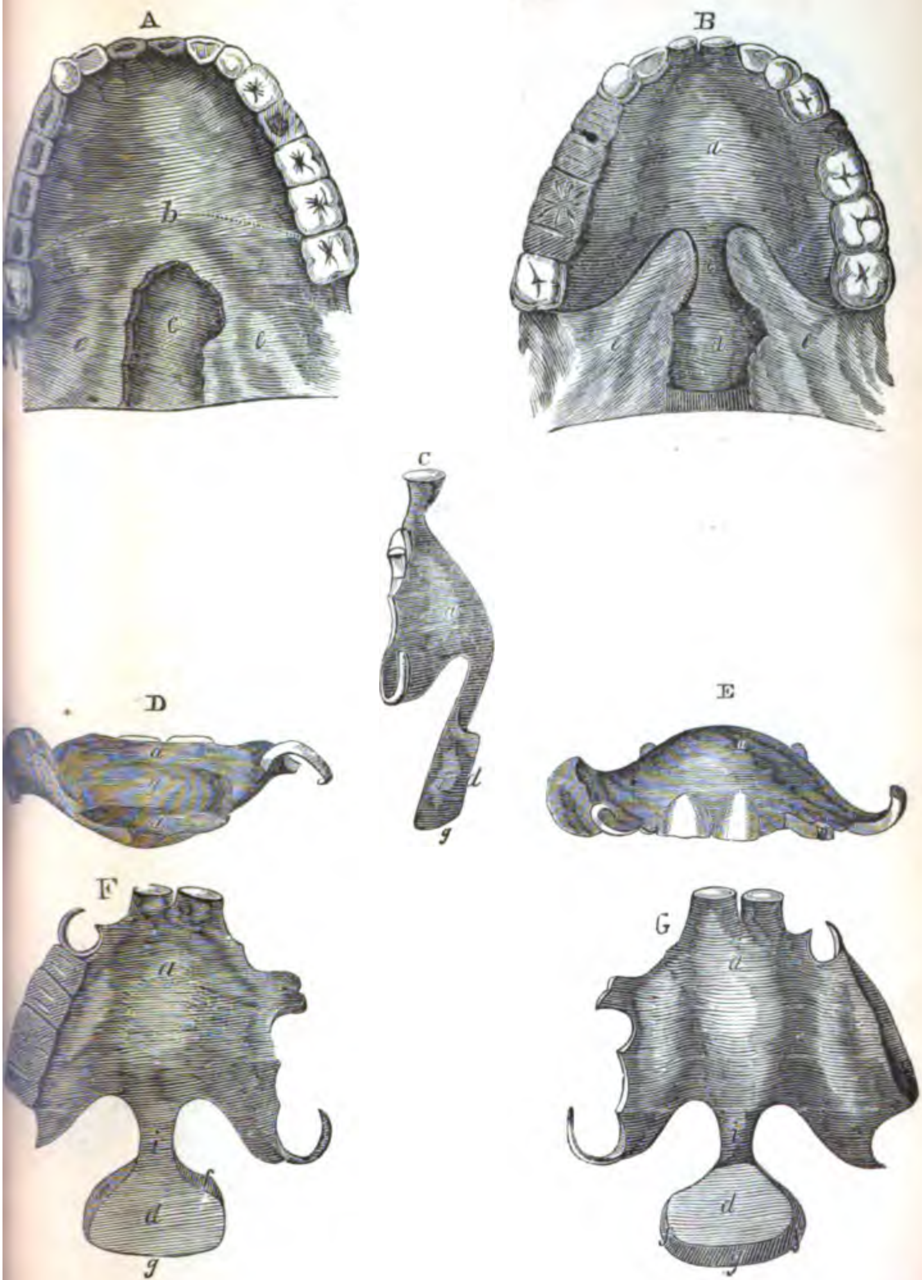
Figure A. Representation of the mouth without the apparatus.
" B. The apparatus in situ.
" C. Side view of the apparatus.
" D. The apparatus seen from the back.
" E. The apparatus seen in front.
" F. The apparatus seen from below.
" G. The apparatus seen from above.

The plate (a) and its narrow and thin apophysis (i) which extends from the boundary (b) of the hard palate to the commencement of the defect (c) serve only as supporters to the real thick obturator (d.)

The latter lies in the pharyngo-palatine hollow so that the lower surface of the obturator turned towards the mouth, is about on the same level, as the rest of the velum palati (e.) Against the vertical side (f) and back-edges (g) of the obturator the walls of the pharynx lean, if the latter is contracted by a contraction of the superior constrictor of the pharynx. But if the muscle just mentioned is not in activity, the obturator does not touch the pharynx-wall. The contraction of the constrictor superior, therefore, closes the valve, formed with the help of the obturator, between the cavity of the mouth and that of the nasal bone, while any relaxation of the above-mentioned muscle immediately re-opens that valve.

Illustration II. Case of a constitutional fissure of the hard and soft palate.

Plate I.



DECEMBER, 1867.

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A. SNOWDEN PIGGOT, M.D.,

AND

F. J. S. GORGAS, M.D., D.D.S.

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ORIGINAL COMMUNICATIONS.

ARTICLE I.

A New System of Artificial Palates.

By Dr. Wilhelm Suersen, Sr., Berlin, Prussia.

(Provisional Extracts from a Lecture "On the restoration of a distinct utterance by means of a new system of artificial palates to be employed in cases of congenital and acquired defects of the palatine organs." Held at Hamburg on the 5th of August, 1867, at the 6th Annual Meeting of the Central Association of German Dentists. A short sketch extracted from the report on the sitting of the above-named meeting.)

The theory of the formation of sounds, which forms the basis of my system, may be set forth in a few simple propositions. These propositions are based on the works of Merkel and Brucke, especially on that of the last-named author.*

*"Anatomie und Physiologie des menschlichen Stimm- und Sprachorgans von Dr. Carl Ludwig Merkel." Leipzig, 1863, und "Grundzuge der Physiologie der Lautbildung von Professor Dr. Ernst Brucke." Wien, 1856.

The complete stenographic report, containing the exact description of the technical manipulations, is now printing, and will first be published in the organ of the above-mentioned association: "German Quarterly Journal for Dentology."

1. The air, having passed through the larynx and communicated verberations to the chordæ vocales, (which produces the sound,) finds at this point two ways open to it: the one leading below the velum palati through the cavity of the mouth; the other above the velum palati through the cavity of the nose.

2. The nasal sound arises: whenever the air current finds no impediment to its entering the cavity of the nose, and in this respect it is quite indifferent, whether the air can freely issue from here through the nostrils, or whether, while the nostrils are closed, it is made to reverberate only within the cavity of the nose. In proof of the first proposition Brucke (l. c.) states a simple experiment: "Hold a feebly burning light, (say a wax-taper) before the face, in such a manner, that the flame may be met by the breath issuing from the nose, but not by that from the mouth. Then pronounce a pure vowel (*a* for instance) without a nasal sound, and the flame will remain entirely unmoved. But it will at once begin to flutter, when you pronounce the same vowel with a nasal sound."

3. All letters, with the sole exception of *m* and *n*, (to wit in German,) may be pronounced both with and without a nasal sound.

4. The two letters *m* and *n*, on the other hand, can be pronounced only through the nose; in pronouncing the former letter, we close the gates of the lips, in pronouncing the latter, we shut the tongue-gate.

5. In order to be able to pronounce all letters distinctly, it is accordingly, necessary, (besides other conditions, which are far away from our present subject) to separate the cavity of the mouth from the cavity of the nose by means of muscular motion.

6. That separation is, under normal conditions, effected: on the one hand, by the velum palati, which strains itself (consequently by the levator and tensor palati;) but on the other hand, also by a muscle, which, to my knowledge has in connection with these operations

not yet received a sufficient amount of attention—I mean the *constrictor pharyngeus superior.* This muscle contracts itself, during the utterance of every letter pronounced without a nasal sound, just as the levator palati does. The constrictor muscle contracts the cavum pharyngo-palatinum, the pharynx-wall bulging out—and it is chiefly on the action of this muscle that I base the system of my artificial palates.

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Gentlemen! But a short time since we were clamoring for recognition and equal footing with the liberal professions. To-day, I congratulate you upon having secured all we deserve, as co-laborers in a special science from those professions, and far more I fear than we can maintain properly with the meagre educational attainments that exist at present in our ranks. We have in contemplation a liberal and flattering arrangement for a college of dentistry in Massachusetts connected with Harvard College, which if we can inaugurate successfully by able men for Professors, will supply what has long been needed in this section of the country. Massachusetts ought to lead the way, and hold a supremacy in dentistry as in other sciences,—it remains to be seen whether we have the ability as her sons, to keep her fair name in the front rank.

A talented member of the profession recently asserted, that in the past six years dentistry had been completely revolutionized. This is true to a great extent;—one hardly knows which is the most difficult for an old practitioner to unlearn the old practice, or adopt the new in this age of progress. In the rush of new ideas, new methods, and new substances, we are tempted perhaps too much to experiments which may not be so fortunate for our patients, or, for our reputation.

We live in an era when nearly every department of manufactures and mechanism is characterized by poor and cheap work, which all springs from a neglect of the great moral obligation resting on every man to produce his best.

No one has a right to make a poor thing even for himself: it is a bad example, the evil effects of which are not confined to him alone. There is no mediocrity in God's work, and we are instructed to take Him as our great pattern.

Let us individually set ourselves against this tendency of the times and conscientiously give our best efforts in every undertaking,

The pen though little used in modern dentistry as our

meagre literature proclaims, seems an attractive instrument for the aspiring student; never was there a better opening for young men of talent and education, than in this age to acquire reputation in the profession. The great misfortune of many now in practice is a deficiency in an early, and thorough education to start with. The coming age will much improve in this direction, with the greater privileges, and facilities enjoyed, and the demand for, and compensation offered to, talented labor.

Our hands should not only be educated and our hearts interested in our work, but our minds should be active, and growing.

Said Webster the statesman: "If we work upon marble it will perish—if we work upon brass time will efface it; if we rear temples, they will crumble into dust; but if we work upon our immortal minds—if we endue them with principles—with the just fear of God, and our fellow men—we engrave on these tablets something which will brighten to all eternity."

ARTICLE III.

The Physical History of Various Nations of the Earth, With Special Reference to their Teeth.

By Dr. J. Allen.

(Continued.)

The Fejeeans are generally above the middle height, and exhibit a great variety of figure. Their complexion is between that of the black and copper colored races, although instances of both extremes are to be met with, thus indicating a descent from two different stocks. The faces of the greater number of the Fejeeans are long, with large mouth, *good and well set teeth.*

Leaving the Fejee Islands, we will pass to the coast of

Australia. Captain Wilks, who was sent out by the government of the United States on an exploring expedition, says: "The natives of Australia differ from any other race of men in features, complexion, habits and language. Their color and features assimilate them to the African type, their long and black silky hair has a resemblance to the Malays; in their language they approximate more nearly to our American Indians, while there is much in their physical traits, manners and customs to which no analogy can be traced in any other people. Their color usually approaches chocolate, a deep umber, or reddish black, varying much in shade in different individuals. The cast of the face is between the African and Malay, the forehead usually high and narrow, the eyes small, black and deep set, the nose much depressed at the upper parts, the cheek bones are high, the mouth large and furnished with *strong, well set teeth.*"

We will next direct your attention to the American races or tribes of this continent. Dr. Morton who has published a very popular work on American skulls, says: "It is an old saying among travelers, that he who has seen one tribe of Indians, has seen all. So much do the individuals of this race resemble each other that notwithstanding their immense geographical distribution, and those differences of climate which embrace the extremes of heat and cold, there is a remarkable identity of physical characteristics throughout this whole race of people. All possess, alike, the long, lank, black hair, the brown or cinnamon colored skin, the heavy brow, the dull and sleepy eye, the full and compressed lips, and the salient but dilated nose."

Without following this author through his details of the physical characteristics of the American races, we will pass at once to his records of their teeth. He says: "The cheek bones are large and prominent, the upper jaw is often elongated, but the teeth are, for the most part vertical. The lower jaw is large and ponderous;

the teeth are also very large and seldom decay, and few present marks of disease, though often worn by the mastication of hard substances."

With reference to the nations of the western coast of North America, we have the following record from Captain Cook and Mr. Anderson :

"The visage of most of them is rather round and full, and sometimes also broad, with high, prominent cheeks. The nose flattened at the base, the forehead is rather low, the eyes small, black and languishing rather than sparkling, the mouth round, with thickish lips, *the teeth well set* but not remarkably white."

We will now direct attention to the nations of Chili, of California, and to those of the country near the Baie des Francais, who are of the Kolushian race. In the historical account of these people, by Mr. Rollin, we have the following : "They have rather a low forehead, black and lively eyes, nose of a regular shape and size, rather wide at the extremity ; lips fleshy, a mouth of middle size, *fine and well set teeth.*" We will also notice the Peruvian nations. The physical characteristics of these nations in general are described by Dr. Orbigny. He says: "Their features have an entirely peculiar cast, which resemble no other American people but the Mexicans. Their head is oblong from the forehead to the occiput, somewhat compressed at the sides. The forehead is slightly arched, short, and falling a little back. Their face is generally broad, approaching to an oval form ; their nose prominent, long, and strongly aquiline ; the mouth is larger than common, though the lips are not very thick. The teeth are *always beautiful, even in old age.*" Dr. Orbigny says the mountaineers in South America are generally short, while the inhabitants of the plains are tall. "The Aroucans are a square, stout set of men with robust limbs, but without obesity ; their joints large, their hands and feet small. Their heads are large in proportion to their body ; the countenance full, round, with

prominent cheek bones, large mouths, but thin lips. *Their teeth are good, and remain sound in old age.*"

"The aboriginal nations of Eastern Patagonia," says Captain Fitzroy, "are a tall and extremely stout race of men. Their color is a rich, reddish brown. The head of the Patagonian is rather broad, but not high; the mouth is large and coarsely formed, with thick lips. Their teeth are usually *very good*, though rather large, and those in front have the peculiarity of being flattened, solid, and showing an inner substance." The following is an extract containing a description of the Pesherais, a people who inhabit one of the islands of the Magellanic Archipelago. (This extract is taken from an account of an exploring expedition sent out by the United States government.)

"These people are not more than five feet high, of a light copper color. They have short faces, narrow foreheads, and high cheek bones. Their eyes are small and unusually black. Their nose is broad and flat, with wide-spread nostrils, mouth large, *teeth white, large and regular*." Dr. Orbigny in describing another tribe of the South American Indians, (called the Botocudos) says: "They wear for ornaments, collars or strings of human teeth." This is an evidence of their soundness and beauty. In the northern division of South America we have the following physical description of a people called the Chaymas. Humboldt has given the following description of them:

"The countenances of the Chaymas, without being hard and stern, has something sedate and gloomy. The forehead is small but slightly prominent. The eyes black, sunken, and very long. The wide mouth, with lips but little prominent, has often an expression of good nature. The nose and nostrils resemble those of the Caucasian race." "The Chaymas," says Humboldt, "have fine, white teeth, like all people who lead a very simple life."

Having taken a cursory view of the characteristics of several other nations of the world, with special reference to their teeth, we will now return to our own country. We have here a mixed population from various parts of the world, who have become so assimilated in habits, manners, customs, mode of living, etc., that the historian would recognize the same general physical characteristics of the people throughout the United States. But how different would be his record in reference to the teeth of the Americans at the present time from those nations herein referred to. He would tell you that very many of the people of this country have narrow, contracted jaws, with crowded and badly decayed teeth. And in his statistics he would announce to you the startling fact that twenty millions of teeth are annually lost by the people of this country. From the evidences which we have endeavored to bring before you, it will be seen that the teeth of the people of this country are far worse than of any other here described. Mark the words of Humboldt when he said: "The Chaymas have fine teeth, like all people who lead a very simple life." It will be observed that in these historical researches, there is no evidence that the nations Humboldt alluded to attempted to improve their food by changing the proportions of the different constituents which the Creator has duly apportioned for the building up of organized beings. But, on the contrary, those nations use their food in the most simple forms, with all the constituents which nature placed there for the use of man. Another important fact in the history of those nations who have well developed jaws and teeth, should be also noted. It is this: they have plenty of exercise in the open air, which enables them to appropriate the different constituents in their food to the various parts and organs of the human system. From these different nations, therefore, we may learn some valuable lessons on the subject of the teeth. Although they have no Dentists nor Dental literature, (for they need none) yet they learn

much, as we may, from Nature, which will be found to tally exactly with true science.

Now let us turn again to our own records and see how widely we have departed from some of those physical laws which have been established by Omnipotence for our well-being. We have vainly attempted to improve our bread (the staff of life) by changing the proportions of the mineral element in the flour we use, by bolting the most of it out and discarding it. Look for a moment at the gigantic scale upon which it is done in this country. According to our national statistics of 1860, there were in the United States, 13,868 milling establishments for the manufacture of flour and meal, requiring 27,626 men, at an annual cost for labor of 8,721,391 dollars. Thus, you see, the number of men, mills, bolting cloths and dollars that are employed in this great *improvement* (?) devised by man for changing the proportions of one of the most important constituents in the staple article of food in this country. The result of ignoring this mineral element from the staff of life is, undoubtedly, to a great extent one of the most prominent causes of this national calamity, that sweeps from the population more than 20,000,000 of teeth every year. The potter cannot make the bowl without the clay, neither can good teeth be formed without a due proportion of lime, which is abundantly provided for our use upon the outer portion of the grain, and in rejecting this portion of the cereals we virtually refuse to use the requisite materials of which the teeth are formed. We also deprive ourselves of a due proportion of atmospheric constituents, especially in our crowded cities. And also of the requisite amount of exercise to promote vigorous health and good constitutions. If we would be instrumental in doing more good in our profession, let us do all in our power to diffuse these important truths among the people.

ARTICLE IV.

Necrosis of the Upper Jaw from Secondary Syphilis.

By S. D. French, D.D.S.

The following case came to me for treatment in the month of February, 1866. The gentleman was a captain in the regular army, and had been stationed at one of the forts in Kansas. He had contracted syphilis while in the army, and had been treated by the surgeon, and cured as he supposed, but after a few months secondary syphilis set in, and was so severe that he was obliged to leave the army and return home. He arrived in October and immediately placed himself under the care of his family physician who treated him till he came to me. Feb. 3d, 1866 he called the first time, and I made a thorough examination of the mouth, and found that the alveolar process around the teeth inclusive of from the first molar on the left around to the second bicuspid on right side (upper maxilla) was necrosed. He informed me that his physician had been attending him since October 25th, and treating him for catarrhal ozena up to the time he called upon me, when, as I said before, I found the bone very much diseased. I made an appointment with him for the next week.

February 9th, patient called according to appointment. I extracted the central, lateral and bicuspid on the right, and the cuspid on the left side, the other teeth having been extracted before. The teeth which I extracted on the right side were very loose, so much so that by pressing the finger against the palatine surface of the teeth you could see up to the apex of the root, the only attachment between the teeth and gums being on the labial surface, and that very slight.

The cuspid on the left side was more firmly attached to the gums. I say gums for the alveolar sockets were so diseased that there was no attachment between them and the teeth. After removing the teeth I commenced the operation of removing the dead bone. I took out some

twelve pieces at this sitting, some of them one half an inch square, but the most of them smaller. After I had removed all the dead portions of bone possible at this sitting, I washed the parts with warm water, and then with a weak solution of creosote and iodine equal parts, and gave the patient some wash to use during the day, requesting him to call again at the end of two days. Feb. 12th patient called again. I found that the inflammation had subsided somewhat, but could see that there was considerable of dead bone yet to be removed and with my instruments I commenced operations the second time, to my surprise finding that there was about as much dead bone to be removed as at the former sitting, although the pieces were much smaller. I ordered him to continue the use of the wash. He called again February 14th, when I removed one small piece of dead bone, but aside from the point it occupied, the inflammation had almost entirely disappeared, and the parts had assumed a healthy appearance. I think I never saw such a rapid recovery of diseased parts as in this case. The patient continued the use of the wash for about two weeks longer, at the end of which time I was able to take an impression and make him a substitute for the lost parts, which he has been able to wear without much difficulty. He continued the use of the wash for about six months when the parts were entirely healed. I made a second plate for the same mouth the latter part of June, 1867. I found that new bone had formed, and the mouth was in a healthy condition.*

ARTICLE V.

Plan for obtaining a more perfect fit of Vulcanite Plates.

By W. Leigh Burton, Dentist, Richmond, Va.

(Secretary of the Virginia Dental Society.)

It sometimes happens, after a vulcanite plate has been completed and tried in the mouth, that from some defect

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*We have received from Dr. French a plaster model of the mouth which shows how successfully he has treated this case. *Editors.*

in the impression—particularly in very deep mouths—the plate does not fit the palate with sufficient accuracy to produce the necessary suction. If another impression is taken in plaster or wax and the plate made over, the chances are that the second attempt is apt to be a failure also. To insure certainty and save time, I have adopted the following simple plan :

Place a piece of soft wax on the posterior-palatine surface of the plate, or wherever the fault exists, place it in the mouth, press it with some force, and the pressure will cause the surplus wax to be forced out. Now take the plate and cover the palatine surface with plaster and allow it to harden. The space occupied by the wax is where the fault exists. The wax is then removed, and the plate, by being softened over a spirit lamp can be easily pressed down to its proper place.

ARTICLE VI.

Carbolate of Iodine.

By D'Oyley Evans, D.D.S., Paris, France.

Messrs. Editors :—

I have just read a letter published in *Le Journal des Connaissances Medicales*, addressed to Dr. Caffe, on Dr. Percy Boulton's late discovery of the action of Carbolic or Phenic acid on Iodine.

And thinking that after the conversation I had with you while in America about Phenic acid, that the above mentioned letter may interest you, I will give it, with some observations of my own apropos to the same combination, which I have used for some time for inflammations of the mouth.

"The inconvenience," says the writer, "attending the external application of iodine and its preparations is so serious, that physicians are often obliged to abandon a

remedy, the therapeutic efficacy of which is undoubted, nay almost unequalled in materia medica." "The great objection to the external use of this remedy is, that it leaves marks both on the linen and on the skin."

"This is a sufficient motive for seeking some means of getting rid of this drawback, especially in the case of ladies." Dr. Percy Boulton's method consists in adding a few drops of Phenic, (carbolic) acid to the iodine solution to be employed." "This addition renders the iodine perfectly colorless, so that it may be applied with impunity." But this combination has another advantage. It appears from that practitioner's observations, which I can confirm, that, so administered, *Carbolate of Iodine*, which is the new substance in question, is not only one of the most powerful antiseptics we possess, but is intrinsically a more efficacious agent than iodine alone. I have used this compound in the form of injections, gargles and lotions in all cases in which iodine is prescribed. For diseases of the antrum, abscess, sore-throat and inflammation of the gums.

This preparation is almost a sovereign remedy, since besides its disinfecting qualities, it modifies the mucous membrane, causes all local sensibility to disappear, and cures the patient much sooner than if either of the two agents were employed separately. The formula I employ is as follows:

℞.	Compound Tinct. of Iodine . .	3 gms.
	Pure Carbolic acid . . .	6 gtts.
	Glycerin	30 gms.
	Distilled Water . . .	150 gms.

CORRESPONDENCE.

Letter from Paris.

PARIS, *October* 10, 1867.

MESSRS. EDITORS:

THE remarkable effects of Bromide of Potassium as a revulsive and anæsthetic agent now renders the study of its physiological action a matter of considerable importance.

In the *Journal des Connaissances Medicales* we find a paper on the subject by Drs. Eulenburg and Guttmann, who have effected experiments with it on rabbits as well as frogs. The sub-cutaneous injection of from two to four grammes of bromide of potassium produces on rabbits a perturbation on the action of the heart, accompanied by diminished sensibility and weaker voluntary action: it kills them in the course of from 10 to 40 minutes with the symptoms of paralysis of the heart.

This paralysis is not retarded by continuing respiration artificially by means of tracheotomy. If instead of injection, the same quantity of the substance be injected under the form of a solution in four parts of water, it will kill with the same symptoms, corroding the mucous membrane of the stomach.

Smaller doses are seldom mortal, the symptoms produced are ephemeral and sometimes preceded by slight shivers. Similar effects to those described are produced on frogs with doses of from six to nine hundredths of a gramme. Hence it appears that bromide of potassium exercises a special action on the heart; but does not operate in a direct manner on the peripheric nerves or on the muscles.

But in all these effects potassium seems to be the real agent, quite independently of bromine. The latter, even injected pure in much larger doses than those above employed, exercises no particular action on the heart or on

the nervous system, and does not kill the animal. Frogs will resist the inhalation of bromic emanations. Nor has bromide of sodium any effect similar to those of bromide of potassium, for it kills very slowly, merely producing great general weakness.

The adulteration of Bromide of Potassium by Iodide of Potassium has become such a serious question in a therapeutic point of view, that it is a matter of great interest to find some easy way of ascertaining it. Several ways have been proposed, but none of a very practical kind and possessing at the same time a sufficient degree of exactness.

A paper by M. Amédie Blacher, in the *Journal des Connaissances Medicales*, is on this account deserving of notice.

Mr. Blacher starts from the following facts:—1. Bromide of potassium yields a white precipitate with salts of lead; iodide of potassium a yellow one.

2. Pyroligneous acid dissolves iodide of lead, especially at the temperature of ebullition.

3. It also dissolves bromide of lead.

4. Bromide of lead is more soluble in pyroligneous acid than the iodide of the same metal. The two latter observations are due to Mr. Blacher himself.

Now when at the common temperature, pyroligneous acid is added to a precipitate of bromide of lead mixed with iodide of the same, the latter is detected by the yellow spots which almost instantly appear in the midst of the white mass.

Moreover the iodide may be separated from the bromide by cooling their solution in a liquid composed of one part of pyroligneous acid and twelve of water for in this case the iodide is precipitated while the bromide remains in the liquid. The former may then be collected and weighed. Mr. Blacher's plan of operations may now be easily understood.

Suppose we have some bromide of potassium which we have reason to suspect of being adulterated with iodide.

We transform the bromide in question into that of lead by adding to its solution in water an excess of liquid sub-acetate of lead, a substance which will equally decompose the iodide of potassium.

On examining the precipitate found, if it be white, there is no iodide in it, if on the contrary, it be tinged with orange, we shall have prima facie evidence of the presence of iodide. In order to determine the quantity of the latter, the precipitate must be washed and dried, then dissolved in the pyroligneous liquid above described, and this solution being put into cold water, the iodide will precipitate and the bromide will remain in the liquid.

The Exposition is nearly finished and I have scarcely had time to visit it. What I saw in the dental department, is scarcely worthy of notice outside of the fine specimens of of artificial teeth manufactured in America. A very thorough account will be published I believe at the expense of the government, when it appears I will send it to you.

D'OYLEY-EVANS.

Virginia Dental Society—Annual Meeting.

THE annual meeting of the Virginia Dental Society was held on the 21st of October at the office of Dr. John Mahoney.

The old officers were reelected, with the exception of Dr. John G. Wayt, who declined being a candidate for the presidency. The following dentists are officers of the Society:

Dr. R. N. Hudson, president; Dr. G. W. Jones, vice-president; Dr. W. Leigh Burton, secretary; and Dr. J. Edward Chase, treasurer. Executive Committee: Drs. J. Hall Moore, Joseph Woodward, and George B. Steel.

Besides other business before the Society, the propriety of abolishing the present tariff of charges for professional services having been discussed, on motion it was

Resolved, that the tariff of charges adopted at a meeting of this Society March 2, 1867, be, and the same is hereby, abolished.

W. Leigh Burton,
Secretary.

Answers to Querists.

Properties, Generation and Administration of Nitrous Oxide Gas. Query 3d.—*Administration of Nitrous Oxide Gas?* *Answer.*

If nitrous oxide gas is breathed for about thirty seconds and then taken away from the patient, violent muscular action attended with earnest declamation immediately follows the removal of the inhaling tube from the mouth.

When, however, this gas is breathed for one and a half to two minutes, complete repose attended with perfect anæsthesia ensues. It is easy to administer the gas until complete anæsthesis is produced; for after the first three or four inspirations the patient eagerly desires more, and all dread appears to have passed away.

"The dose of nitrous oxide necessarily depends upon the varied circumstances of race, age, sex, constitution, temperament, idiosyncrasy, and special application." "Thus for instance, as a general rule, persons of a lymphatic can bear larger quantities than those of a sanguine or bilious temperament; and these latter more than the nervous.—these being frequently very susceptible to its excitant influences." "Besides, as with most other agents, males will usually require more than females, adults than youths, and these again more than children." (*Zeigler.*)

In using this gas for dental operations, such as the extraction of teeth or the destruction of nerves of teeth, the patient should be seated in a suitable chair, which will admit of the back being lowered in cases of necessity.

A cork of the proper size, with a string attached to it, is placed between the jaws to prevent the closure of the

mouth. The object of the string attached to the cork, is to guard against the unpleasant effects which might result, should the cork become displaced during the administration of the gas. A fatal case occurred in Philadelphia sometime since from carelessness in this respect; the cork slipped from between the teeth, and lodging in the throat caused death from suffocation.

Previous to the application of the inhaler or breathing tube, the patient is directed to take a full inspiration, followed by an exhalation, for the purpose of emptying the lungs as perfectly as possible of atmospheric air.

When this is done the mouth-piece of the inhaler is placed in the mouth and the patient requested to keep the lips tightly closed upon it. The nostrils are then held by an assistant, or where Clarke's rubber bag is used the fingers of the left hand press this bag closely over the nose and mouth about the mouth-piece of the inhaler, and at the same time support the breathing tube to which the inhaler is attached. The patient is then directed to take full inspirations. The first evidence of anæsthesia with the majority of patients, is snoring, like that of deep sleep.

To determine the proper time for operating, or as it has been termed the surgical period, the patient, previous to the administration of the gas, should be directed to raise the hand at every order of the operator.

Inability to make this motion is an evidence of the loss of voluntary power, which is soon succeeded by that of insensibility to pain.

As soon as the operation of extraction is performed, especially if the back teeth have been removed, the head of the patient should be inclined forward, or held over the spittoon, to prevent the blood from running down the throat, the cork removed from the mouth, which is readily done by means of the projecting portion of the string attached to it, and fresh air admitted into the room.

For the production of anæsthesia the inhalation of from

four to eight gallons of the gas, will, in the majority of cases, prove sufficient. The gas can be inhaled from an India rubber bag, or from a tube leading directly from the gasometer, having attached to it a proper inhaler.

The method of inhaling the gas directly from the gasometer, is preferable in many respects to the use of the rubber bag, although some of the objections to the bag are obviated by having a proper inhaler attached to it.

It has been suggested when the operation is a protracted one, that the inhaler be removed from the mouth, fresh air admitted into the lungs, and the gas again administered without interrupting the anæsthetic condition.

The inhaler or breathing tube for the administration of nitrous oxide gas is constructed of vulcanized rubber or metal.

It consists of a tube and mouth-piece, the tube containing two valves, one valve upon the inside of the tube to allow the gas to pass through to the mouth of the patient; the other upon the outside to allow the exhalation to pass off and not be again inhaled. Attached to the tube is a stop-cock to arrest the flow of gas when desired.

A number of these inhalers are in use, known by the names of their inventors.

In certain conditions nitrous oxide gas, like other general anæsthetic agents, may produce dangerous and even fatal results, although it is considered safer than ether or chloroform. In disease of the heart, in active congestion, or acute inflammation of the brain, lungs or kidneys, or in a general plethoric condition, or where there is a tendency to a hemorrhagic diathesis, its use as an anæsthetic agent is attended with danger.

SELECTED ARTICLES.

ARTICLE VII.

Successful Operation on Harelip.

By Arthur B. Stout, M.D., of San Francisco.

The result, was obtained by three distinct operations. The first operation was performed at the age of eight months; the second operation at the age of two years and nine months; and the third at three years of age, in March, 1867.

The utmost care was taken that the child should be in fine health before the operation. Children born in the family previous to the present one had no deformity, and an infant born since has a perfect lip. The father has a slight imperfection of the right ala of the nose—the effect of an accidental injury. Whether or not the harelip can be referable to this circumstance can only be conjecture.

As, however, the mother made inquiries, and expressed apprehension in reference to future progeny, I determined to forestall, if possible, any such event by commencing the operation at the earliest date. To allay mental misgivings and apprehensions; to remove the constantly recurring presence of the deformity from the sight of the parent, and demonstrate to doubting eyes that a defect, before which even death seemed a more desirable alternative, could be transformed into an endurable condition, was the inducement to hasten the operation to the earliest period given. It is true the books generally recommend postponing such operations until the lip obtains more ample developement; but to my mind the reasons above mentioned should have the precedence in authority.

By observing carefully the mouth of the infant, it was seen that two splits in the lip ascended high to the ala of the nose. The central portion of lip was very short, and

was pressed forward by a bone which projected behind it, and to which it adhered by a large base. This bone was a true intermaxillary bone; but instead of standing vertically between the right and left intermaxillaries, it protruded horizontally, forcing the central lip before it. There was no division in the palatine bones nor in the soft palate. Hence it would be difficult to ascribe this harelip to an arrest of developement on either side of the child's body.

The first operation was the excision of the median bone. It was done by dissecting the soft parts from the bone as closely as possible. When the bone was thus exposed it was easy with cutting forceps to remove it by two lateral cuts. A small opening was made in the palatine bone which, however, soon closed and gave no inconvenience. After two years and nine months the second operation was performed, A thin slip of cork was placed under the whole upper lip, which served the double purpose to prevent the flow of blood into the mouth and form a firm basis to cut upon. Over this cork the middle lip was drawn down with force enough to stretch it, and was so pinned fast; the corresponding edge of the lateral lip was then drawn near to it, and pinned to the cork. With a sharp bistoury the edges were cut clean, and immediately the suture pins were introduced, three in number. The cork pins were then removed and the suture thread applied.

The third operation, performed nearly nine months after, was nearly a repetition of the same proceeding. The union of the middle lip to the right lateral lip was done under considerable difficulty, the two edges being of very different length. The admirable suture pins made with little silver cylinders, armed with moveable steel trocar points were used, and proved much better than insect pins. Chloroform was used in each operation, and the closest attention given to the frequent renewal of adhesive straps, both before and after the removal of

the pins. In consequence of the strength and opposition of the child, it was necessary to give chloroform to renew the first dressings, and bind him firmly to the table. Too much care cannot be taken with these precautions, as one untimely jerk of the child may frustrate the whole work.—*Pacific Med. and Sur. Journal.*

ARTICLE VIII.

Carbolic Acid in Surgery.

By GEORGE DERBY, M.D., Surgeon to the Boston City Hospital.

THE use of carbolic acid in surgery is based directly upon the investigations of M. Pasteur on putrefaction, in which he shows the relation of infusoria to the process. The results of his experiments, as published in the *Comptes Rendus* of the French Academy, and in thé *Annales des Sciences Naturelles,* are briefly these:—Putrefaction* is fermentation. Fermentation is putrefaction. The process is one and the same, and in all cases determined by the presence of infusoria. They, in fact, are the true ferment. These infusoria are minutely described by Ehrenberg and also by Pasteur. They are chiefly Vibrios and Bacteria. Pasteur† says they resemble, in certain respects, plants rather than animals, and they may be regarded as among the most minute and imperfect organized forms of life, whether of the animal or vegetable kingdom.

"Should the microscopic beings disappear from the globe, the surface of the earth would be encumbered with dead organic material, and bodies of all sorts, animal and vegetable. Without them life would become impossible, since the work of death would be incomplete."‡

*Comptes Rendus, t. 56, p. 1189 † Ibid, t. 52, p, 1260. ‡ Ibid, t. 54, p. 265

The above extract from Pasteur shows how far these ideas of putrefaction reach. They revolutionize the doctrine that the vital principle alone defends organic material from the destructive action of oxygen, and shows that neither air nor water can convert organized substances into simple elements. That process is due to infusoria.

These organic germs are everywhere present in the atmosphere.* Pasteur found them on the Jura, at Montanvert, and at other great elevations, although in diminished numbers, In Paris, every bubble of the air contains myriads. In hospitals they particularly abound. It is certain that they exist in every place occupied by man.

The application of these ideas to practical surgery was first made by Mr. Lyster, a surgeon of Glasgow, and an account of his experiments has been recently published in the London *Lancet*. He sought to prevent decomposition of the fluids thrown out in cases of compound fracture. To do this an agent was required sufficiently powerfully to kill the infusoria already admitted by the external wound, and which should not be also destructive to the tissues. Such an agent is found in carbolic acid. This he applies freely to all lacerated parts which have been exposed to the air, and then seals up the external wound with the same substance, claiming that by this process a compound fracture is converted into a simple one. Abscesses are also treated on the same principle, the access of infusoria to their interior being prevented by holding a cloth wet with carbolic acid in front of the abscess at the moment of making an incision.

It has occured to the writer that a simpler and more effectual way of securing this result would be by throwing a jet of carbolic acid spray from an atomizer upon the point of opening.—*Boston Med. and Surg. Journal.*

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* Annales des Sciences Naturelles, t. 16, p. 45.

ARTICLE IX.

Gun-shot Wound of the Heart.

By V. S. Lindsley, M.D., of the University of Nashville.

The following is a curious case. The evidences pointing to a wound of the heart are so strong, amounting almost to a certainty, that to call it a gunshot wound of the heart hardly seems a venture. There are cases on record whose history did not show such clear and pointed evidences of a wound of this organ during life, and yet an examination after death revealed that the heart had not only been wounded, but its cavity penetrated.

L. P., æt. 24 years, in full health and in the enjoyment of a vigorous constitution, was loading and adjusting a small four-barrelled Sharp's pistol on Saturday, the 22nd of May, 1865. The barrels of the pistol joined the stock by a hinge joint, and fastened by a spring. Holding the barrels in his left hand, he inserted the cartridges, and, thinking everything right, sprung the barrels to their place. As he did so one of the cartridges exploded and the ball entered his chest between the fourth and fifth cartilages, one-half inch to the left of the sternum, and on a line with the left nipple, the direction of the ball being oblique from right to left. The ball was of trifling size, being about 1-5 of an inch in diameter, and perhaps 2-5 in length. His first idea was that the wound would be fatal, and desiring to seek aid, he repaired immediately to a physician's office near by and fainted just after reaching the room.

From the time of the explosion of the cartridge to the fainting, patient describes the pain as "excruciating and very acute in the region of the heart, as if a sharp knife had been driven in and worked back and forth." A feeling of dizziness was soon added to the pain.

It was at this juncture I first saw him, and to all appearances it seemed likely that death would soon close the

scene. The shock had been powerful, the syncope was very extreme, pulsations at the wrist were absent, and respiration was almost entirely suspended. The hemorrhage from the wound was very slight.

Drs. Briggs and Jennings had been called in and were now present. The case was thought hopeless. There were signs strongly indicating wound of the heart, viz.: the direction of the wound, the extreme anxiety, dyspnœa, syncope, and probably internal hemorrhage. Soon, however, as if awakened by some powerful influence, the patient was thrown into the most violent muscular exertion, so that it required four men to hold him in bed. Strange to say he knew *no* one, and uttered only inarticulate sounds. Chloroform was immediately ordered and administered with the happiest effect. The patient lay at rest, rescued from his tormentor, and breathed quietly but very slowly. As yet there was no pulsations at the wrist and the heart beat feebly. He was now removed to his room, and full doses of morphia administered through the day. The surface of the body remained cool and it was not until eight o'clock at night, that he regained his natural warmth and consciousness.

Sunday.—The syncope following the wound, together with the morphia seemed to have obliterated entirely all recollection of the events of Saturday. When he complained of pain in the chest, he was told it was the result of a fall. Lying in the horizontal position was so painful, that he had to be propped in a half reclining posture. There was no coughing or spitting of blood, nor were his lungs in the least affected.

To control the pain ready to burst forth whenever the anodyne influence subsided, heavy doses of morphia were regularly given.

On Tuesday calomel was added to hold in check any arising inflammation.

Thursday, marked symptoms of pericarditis ensued. Up to this time there was not the slightest intermission of

the very intense pain which commenced just after the infliction of the wound; the patient himself insisting upon the repetition of the anodyne. Thursday evening a blister was applied over the region of the heart. Its effect almost instantaneous; in the language of the patient, "it seemed that some powerful agency was at work drawing the pain from my heart. After that, the the acute pain, though great at times, was often absent. The pain was always at the heart."

For the next seven or eight days his condition gave lively hope of recovery, but on the fourteenth night after the wounding, there was a return of the pain with all its former violence. The blister was reapplied over the region of the heart, and again gave marked relief. Mercury with opium was given every few hours and continued for a number of days for the purpose of inducing ptyalism. But it utterly failed to produce this effect. During the whole time, and he took a large quantity of mercury, there was not the least evidence that the remedy had produced its peculiar effect upon the constitution.

The severity of the pain gradually relented, stimulants and supportive treatment were administered, and the patient had another respite of about seven days. On the twenty-first night the accession of pain was so great, that he thought death was near, and so did his physician. The pain was of the most violent character, originating at the heart and radiating through all parts of the chest. His distress was extreme, and so powerfully did it depress his vital powers, that the heart almost refused to act, the wrists were pulseless, and stimulants were required in liberal amount. The feet were bathed and anodynes again given.

After this night he became more comfortable, took stimulants more kindly, and gradually improved until he became convalescent. The fifth week from date of wound, he rode out in a carriage, and in seven months he was sound and well, able to attend to all his duties as usual.

There is an interesting psychological fact connected with this case. The patient never recalled any of the circumstances of the accidental "going off" of the pistol, nor even the fact of having wounded himself at all, until it was told him after his recovery. When it was mentioned, the whole affair flashed across his mind in an instant, he remembered every thing. During his entire illness the impression had been kept up, that the pain from which he suffered so terribly, was the result of a fall. No doubt the morphia of which he took so largely, tended to prevent his mind from reverting to the accident.

The probability is, that the ball passed through the intercostal muscles, the pericardium, and entered the muscular wall of the heart, but did not pass its cavity. It is now three years since the accident, and the gentleman enjoys as good health, with perfect action of the heart, and freedom from pain, as if nothing had ever occured.—*Nashville Journal of Med. and Surg.*

ARTICLE X.

Naso-pharyngeal Polypus, attached to the Basilar Process of the Occipital, and body of the Sphenoid Bones, successfully removed by a Section, Displacement, and subsequent Re-placement and Re-union of the Superior Maxillary Bone.

City Hospital.—Reported by Dr. Cheever.

The patient, a student, eighteen years old, entered the Hospital, July 20th, with the following history:—

About two and a half years ago he had profuse epistaxis, which continued twenty-four hours. During the six months next following this, he had only occasional slight attacks. At the end of that period he found that his right nostril was wholly obstructed, and he has never since been able to blow through it. He soon became aware of a growth behind that nostril, which gradually

but steadily increased, until within a few weeks of the time of entrance, when it grew rapidly. There was some discharge, but it was not offensive until quite recently.

At the time of admission to the Hospital, the soft palate was found to be depressed and pushed forward until it hung at a right angle with the hard palate, and both it and the tonsil were inflamed. At the right side of the fauces a small ulcerated patch could be seen. By the finger, a tumor could be felt behind the soft palate, firm, full and lobulated, and extending farther up than the finger could be carried. Its lower lobes hung down into the throat. The whole of the upper part of the pharnyx was occupied, except a small space on the left. Nothing could be passed into the pharynx through the right nostril, but the left was clear. Hearing was imperfect in the right ear; and the respiration was mostly through the mouth. The microscopical examination of the debris of the tumor, removed by a digital examination, revealed only blood corpuscles, pus cells and *fibrous* tissue. There was no evidence of malignancy.

The patient was able to take liquid or soft food only. The general health was good, with no hereditary predisposition. He was very desirous of an operation for the removal of the tumor.

There was no question that the tumor must be removed, or, before long, cause the death of the patient. The problem to be solved was as to the best method of operating. Three modes offered themselves for consideration.

1st. By ligature, or the *ecraseur*, through the nares. This was impracticable, because nothing could be passed through the right nostril opposite to which the bulk of the tumor lay; also because it was not a pedunculated growth. Were it practicable, it could only cut off the growth, without eradicating it; and it would, probably, speedily recur.

2d. By section of the soft palate, of the hard palate, and removal through the mouth, with a subsequent operation for staphyloraphy. This mode, advocated and re-

vived by Nélaton, but really as old as Hippocrates, was abandoned on account of the size and high attachments of the tumor, and the fear that room enough to manipulate could not be got through the section of the hard palate.

3d. By removing the superior maxilla—a plain and easy way, but accompanied by deformity and serious mutilation. Here was a young man with a healthy jaw and perfect teeth, and the disease wholly behind it. Could a portion of the jaw be saved? or even the whole replaced? I decided to make a horizontal section of the jaw; depress it, saving all attachments of the soft parts possible; see if the tumor could thus be reached; and, if practicable, to replace the jaw, and try to save it.

July 23d.—*Operation.* The patient was etherized during the first part of the operation, and partial etherization was renewed at intervals; he was seated in a chair, with the head on a pillow.

An incision was made from just below the inner canthus of right eye, downwards by the side of the nose, following the naso-labial fissure, to the corner of the mouth. The inner flap was dissected up until the symphysis was exposed; and the outer, until nearly the whole of the superior maxilla was free. With a narrow bladed saw, about three inches long, the superior maxilla was now divided transversely, about half an inch below the floor of the orbit. The blade of the saw was plunged into the zygomatic fossa, and the front and back walls of the antrum were sawn through horizontally, starting just below the articulation with the malar bone, and terminating in the anterior nares, at the lower end of the nasal bone. The ala of the nose having been lifted up, the right central incisor was next extracted. Strong bone forceps were now used to divide the alveolar process, through the socket of the right central incisor. The cut included the *alveolus only.* The hard and soft palate were not touched. The bone was now held by the palate process, palate bone, and its co-ossification with the pterygoid processes. Seiz-

ing the alveolar process with strong tooth-forceps, the whole section of the superior maxilla was bent down and displaced into the mouth. The antrum was found to be filled by one lobe of the tumor without attachment, while the body of the tumor was attached to the upper, back part and right side of the pharynx and to the base of the sphenoid bone. The body was very firm, and the attachments were broad, covering a space two inches square. These, with considerable difficulty, were severed by scissors, introduced through the opening above the depressed section of the superior maxilla, and the base was cauterized repeatedly with strong nitric acid. The hæmorrhage, which was not excessive, was thereby effectually checked. Four ligatures were applied to bleeding vessels in the course of the first incisions. With the forefinger of the right hand in the throat, and the left in the cavity above the section of the maxilla, they could be made to meet freely, and explore thoroughly the pharnyx, which was now found entirely clear of obstruction.

The superior maxillary bone was now hanging with its antrum exposed; and attached by the bent, or broken hard palate, the unbroken soft palate, and the broken osseous, and unbroken muscular and vascular attachments of the pterygoid process of the spenoid bone. On these attachments we were to rely for the restoration of the bone. The maxilla was easily pushed up into its place, and held by a silver wire passed round the left central, and right incisor teeth; and by the closing of the lower jaw. The flaps of skin were accurately approximated, and united in place by six interrupted sutures.

At the close of the operation, the pulse was 120 and of fair strength. Wine, iced milk, beef tea and opium were ordered, *pro re nata*. 7 P.M. pulse 132. Reaction good. Takes nourishmsnt freely. No vomiting or pain. Urine free. ℞. Pulv. Doveri, grs. x. 10 P.M. Sleeping quietly. Pulse 88. Respiration free.

July 24th, A.M.—Pulse 120, good. Patient in good

spirits. Face drawn a trifle to left side. There is little swelling of the face, and some offensive odor from the clotted blood. The parts syringed with ℞. Tr. myrrh., ℥ i.; aqua, ℥ iv. M. P.M. Pulse 130. No pain. Takes beef-tea, milk, eggs, &c., freely. Sleeps considerably. Functions regular.

July 25th.—Pulse 96. Except some drowsiness, feels very well. Appetite good. Sutures removed, and good union found. Eye nearly closed by adjacent swelling. The nares and pharynx to be syringed twice a day. .

July 26th.—Pulse 112. Looks brighter. Eye very much better. Union of flaps quite firm.

July 28th.—Improving. Discharges more moderate and less offensive. Upper jaw in good position, having fallen only a very little. Appetite good; bowels regular; sleeps well; no pain.

July 29th.—A small swelling of palate just behind incisor teeth lanced. Discharge of pure blood. General condition of patient as good as usual.

July 30th.—Ligatures all away. External wound entirely healed.

Aug. 1st.—Quite comfortable. Discharge diminishing. A small piece of gutta-percha was moulded between upper and lower jaw of right side, and a bandage around the head and chin to keep the bone up in place.

Aug. 3d.—Steadily improving. Jaw in good position.

Aug. 5th.—Discharge from right nostril about normal. Patient walks about Hospital grounds, without suffering any inconvenience or pain.

Aug. 12th.—Still doing admirably, *No purulent discharge.* Some pain on pressure where the jaw was sawed across. Plug between jaws continued. No appreciable motion of parts of bone.

Aug. 22d.—Progressing very favorably. Bandage and gutta-percha removed. Union of maxilla firm. Four weeks since operation.

Aug. 28th.—Discharged at his own request, well. Still wearing the wire about the teeth.

Sept. 2d.—Reported himself at the Hospital, in excellent condition. The wire removed. Union perfect; able to chew; now six weeks since the operation. Respiration clear. Examined with the rhinoscope by Dr. Langmaid, and the pharynx found healthy. A slight catarrh from the right nostril; nothing more.—*Boston Med. and Surg. Journal.*

ARTICLE XI.

Ventilation.

Look at an asthmatic sitting before an open window, regardless of the cold, though it be winter, with his chest heaving laboriously, and his countenance expressive of exquisite anguish. What is the matter? Is he in pain? No. What, then, is the distress? It is simply from want of a due supply of fresh air. The spasm in his lungs not only prevents the free admission of air from without, but the free egress of that which is within, so that the air which is in the lungs is a mixture of foul and good air.

When so many died in the famous Black Hole at Calcutta, it was because the pure air was shut out, that they could not even get as much as the asthmatic does.

Here we have palpable results, and they startle us; and yet we may be suffering from day to day, in so small a way as to be imperceptible, the evil results of deficiency of air, which may so accumulate as to impair the health, and even perhaps ultimately destroy life. It is only a few that occasionally lose their lives suddenly from want of air, but a comparatively slight but continuous deficiency in its supply is constantly destroying vast multitudes by a slow poisoning.

A good supply of fresh air is an imperative necessity. Such a supply it is easy to get when we are out of doors; but we do not get it when we are in doors unless we make special provision for it; or, in other words, unless we take measures to secure ventilation.

A proper supply of pure air in our habitations and places of public meeting *costs something*, at least in cold weather. That is the chief difficulty. Economy is in the way. Less fuel is required with defective than with proper ventilation.

A small room closely shut up is warmed at less expense than a large room with suitable inlets for fresh air and outlets for foul.

The necessity for freeness in ventilation may be seen if we look at the amount of fresh air required for consumption. Each person requires a gallon every minute, that is, fourteen hundred and forty gallons in twenty-four hours. It is easy to see that small and closely shut-up apartments, and large gatherings of people in public buildings, as they are ordinarily constructed, are incompatible with any such supply as this.

That you may see clearly what the necessity for ventilation is, observe what the lungs actually do with the air which they receive. Pure air is composed of three gases in certain proportions: oxygen, nitrogen, and carbonic acid; this latter being in very small quantity. These proportions are altered in the lungs, so that the air which is breathed out is different from that which is breathed in. It has less of oxygen and more of carbonic acid. It is less vivifying by the loss of oxygen—that is, is thus negatively injured—and it has also acquired a positively bad character by the increase of the carbonic acid. Much increase of this renders the air palpably poisonous.

If, therefore, there be great lack of ventilation, as there often is in small rooms in dwellings, or in crowded public assemblies, much injury is done to the health by the diminution of vigor from the loss of oxygen, and by the direct poisonous influence of the added carbonic acid. And if the exposure of these deleterious influences be frequent, there will inevitably be an accumulation of evil results, seen in a broken-down system, in positive disease, and at length in death.

Observe what provision is made in nature for the constant purification of the air, and how this is often more or less defeated by the arrangements of man. As oxygen is taken up in the lungs of all animals, and carbonic acid gas is sent forth from them, breathing is continually deteriorating the air. But this is remedied by a counter operation.

Every leaf that you see is doing just the opposite of what lungs do—it takes in carbonic acid and emits oxygen—so that there is an exchange going on between leaves and lungs. In this way the due proportion of the ingredients of the air is everywhere maintained, so that if the chemist examines air taken from various quarters of the earth, he always finds precisely the same proportions.

But this is true only of air that is free, and not of that which is shut up where there are sources of contamination. Wherever there is breathing going on, if ventilation be not properly attended to there is a want of these natural proportions, and the deterioration is increased by fires and lights, for they, like lungs, use up oxygen, and return carbonic acid to the air.

There is still another important provision for the purification of air. The three ingredients of the air are not of the same specific gravity. The carbonic acid gas is decidedly heavier than the oxygen and nitrogen, and therefore has a tendency to lie below them, as water lies below oil. Now if this tendency were not obviated in some way, the carbonic acid generated from lungs and fires and various decompositions, would accumulate all over the surface of the earth, pushing up the oxygen and nitrogen above it, as water does oil, and would destroy life, and put out fires everywhere.

But this tendency is obviated by another—the tendency of gases to mingle together. It is just as the heavier water does not remain below the lighter alchohol poured upon it, but mixes with it. Agitation promotes this mingling, and therefore, in ventilation, the communication

of motion to the air is an important measure, and should be accomplished so far as it can be done without inconvenience.—*London Herald.*

ARTICLE XII.

Surgical Operations.

From the weekly report of Mass. Gen. Hospital, published in *Boston Med. and Surg. Journal,* we take the following cases.

Cancer of the Tongue. By Dr. H. J. BIGLOW.—Patient, was an elderly man. Tumor of seven months growth situated underneath the right side of the tongue, about the size of an almond-meat, flattened, ulcerated, and somewhat raised from the surface. It was excised, and the hemorrhage, which was free from the whole cut surface, was arrested by the application of the solution of perchloride of iron.

Staphyloraphy By Dr. S. CABOT.—Patient was an adult male. Fissure extended through the hard and soft palates on the median line , anteriorly as far as opposite the first molar tooth. The soft parts being freely dissected.up, the edges were pared and brought together by nine sutures.

Salivary Fistula, By. Dr. S. CABOT.—Patient, a boy. Fistula, following abscess, was situated about three-fourths of an inch behind the posterior edge of the parotid, discharging very little, except during meals, when there is a copious flow of saliva, to the great inconvenience of the patient. Incisions were made in the form of a letter H, the cross-bar of the H running through the fistula, the flaps were dissected up, one entirely cut away, and the edge of the other refreshed so as to get rid of the cicatrized edge of the fistula, and the edges united by sutures.

Contraction of the Jaws. By Dr. H. J. BIGLOW.—Patient a child, entered the hospital one year ago, with loss of

the entire left cheek, by sloughing, after typhoid fever. The gums and teeth were exposed as far back as the coronoid process. The edges were pared and brought together after a long and tedious dissection, extending above the zygomatic arch, and downward upon the neck below the insertion of the tissues of the cheek into the lower horizontal margin of the jaw. The cheek, though tense, had united perfectly, by a horizontal cicatrix about three inches in length. Operation for contraction. The teeth were firmly locked, and the jaw immovable, as the result of the old and new cicatrices, so that a probe could be hardly introduced between the cicatrized tissue and the teeth. The dense tissues were gradually divided until the jaws were relaxed to admit a thin wooden wedge, by the aid of which, and other instruments, together with the successive divisons of the resisting bands as they presented themselves, the jaws at last yielded, and were separated to the extent of an inch. Dr. Bigelow remarked that with great care for months, about one-third of this advantage would probably be retained, which would be a great gain to the patient.

MONTHLY SUMMARY.

A New Process for Preparing Anatomical Specimens.—Dr. Brunetti, of Padua, who received a gold medal at the Paris Exposition, has generously communicated to the international Medical Congress the following particulars of his valuable invention. The process comprises four several operations, *viz.*, 1, the washing of the piece to be preserved; 2, the *degraissage*, or eating away away of the fatty matter: 3, the tanning; and 4, the desiccation.

1. To wash the piece, M. Brunetti passes a current of pure water through the bloodvessels and the various excretory canals, and then he washes the water out by a current of alcohol.

2. For destroying the fat, he follows the alcohol with ether, which he pushes, of course, through the same bloodvessels, and excretory ducts; this part of the operation lasts some hours.

The ether penetrates the interstices of the flesh, and dissolves all the fat. The piece, at this point of the process, may be preserved any length of time desired, plunging in ether, before proceeding to the final operations.

3. For the tanning process, M. Brunetti dissolves tannin in boiling distilled water, and then after washing the ether out of the vessels with distilled water, he throws this solution in.

4. For the drying process, M. Brunetti places the pieces in a vase with a double bottom, filled with boiling water, and he fills the places of the preceding liquids with warm, dry air. By the aid of a reservoir, in which air is compressed to about two atmospheres, and which communicates by a stop-cock and a system of tubes, first to a vase containing chloride of calcium, then with another heated, then with the vessels and excretory ducts of the anatomical piece in course of preparation, he establishes a gaseous current which expels, in a very little time, all the fluids. The operation is now finished.

The piece remains supple, light, preserves its size, its normal relations, its solid elements, for there are no longer any fluids in it. It may be handled without fear, and will last indefinitely. The discovery is a magnificant one, and the sooner medical schools are provided with full cabinets of natural and pathological pieces the better.—*Medical and Surgical Reporter.*

Preservation of Anatomical Subjects.—The object which is to be preserved is dipped in a mixture formed by adding to seven parts glycerin, one part brown sugar and half part nitre, until a slight deposit begins to be perceived on the bottom of the vessel. Putrefaction is thus entirely prevented, the object when taken from the solution being perfectly rigid, but by hanging it in a warm and dry place, the muscles and articulations will recover all their pliancy.

Cryptopia.—A new alkaloid in opium has been discovered by Messrs. T. & H. Smith, which they have named cryptopia. The formula of this new alkaloid is $C_{23}\,H_{25}\,NO_5$. Its primary form is a hexagonal prism, and it is obtained in this condition if crystallized slowly in a tube from its alcoholic solution. Messrs Smith have succeeded in making the sulphate, muriate, nitrate, the sub-

acetate and the acetate; these all crystallize in distinct forms, but the alkaloid itself has much better crystalline forms than any of its compounds. Four or five tons of opium only yield five ounces of muriate of cryptopia.

Malarial Neuralgia Cured by Hypodermic Injections of Quinia.—The *New York Medical Journal* contains the records of six cases of this disease treated in the New York Hospital. The solution employed by Dr. Seguin was prepared as follows: Take of sulphate of quinia, 60 grains; dilute sulphuric acid, 40 minims; distilled water, one fluid ounce. Mix; make a solution, and filter with the greatest care. Thirty-five minims are equal to 4 grains of quinia. The immediate effect of injecting this solution was a severe, burning pain, due to the acid; it passed off, usually, within twenty minutes. Pain and hyperesthesia were arrested, and in some instances slight though distinct local anesthesia produced. No abscess or other unpleasant consequence followed any of the seventy-eight injections used in the six cases. Five of the cases had histories of intermittent fever; in four instances the pain was in the region of the spleen or epigastrium: in one it was in the back, running up to the right shoulder, and the last suffered from sciatica of the left thigh. The amount of the solution injected varied from xviii to xxxv minims. Quinia by the mouth, together with a mixture of bark and iron, were daily administered.

Heat as a Resuscitating Agent.—Dr. J. Richardson, in the *Am. Jour.*, urges from his observation and experiments the importance of direct Heat as an agent in the restoration of still-born infants, in cases of asphyxia from drowning, hanging, or the inhalation of noxious gases, especially the vapor of chloroform. He advises not merely *warming* the surface but artificially warming the blood within the limbs of persons apparently dead, and then propelling by frictions towards the heart as rapidly as possible. The heart's pulsations in many instances really take place, feebly, for a considerable time after being undiscoverable by external observation. The heat should approximate *roasting* as nearly as may be without positive destruction of the tissues. Mere vesication he thinks ought not to be con-

sidered more than a minor evil in comparison with the cessation of life.

Extraordinary Obesity.—A woman named Hogan, wife of a comfortable farmer living at Kilmastulla, Ireland, died recently from obesity. Mrs. Hogan in her youth, showed symptoms of attaining more than ordinary proportions, and she continued to increase in size until, at the time of her death, she had reached the extraordinary weight of forty-eight stone (672 pounds)! She was, for the last few years of her life, scarcely able to walk, and or some time past entirely confined to her bed.

Death from Swallowing Two Ounces of Chloroform.—Dr. D W. Stormont, of Topeka, Kansas, reports (*Leavenworth Medical Herald*) a case of suicide by the internal administration of chloroform. The patient was 26 years of age, and in good health at the time. He swallowed two ounces of undiluted chloroform, at a single draught. In three minutes after he had laid himself composedly down, he could with difficulty be aroused from the stupor into which he was rapidly sinking; and though he could not speak, he indicated that he had severe pain in the region of the stomach. In five minutes, he was entirely unconscious and breathing stertorously. He died, in just one hour after taking the draught. Medical assistance, from some cause, did not arrive until a few minutes before he died, and nothing was done to counteract the effects of the poison. At the *post mortem* examination, the surface generally was livid; the face, neck, chest, and nails very much so. Bloody froth was issuing from the mouth and nostrils. On opening the chest, both lungs were found to be dark externally, and fully distended. They were uniformly congested with dark, liquid blood, and the posterior portions were perfectly engorged with it. Both sides of the heart were nearly full of black, uncoagulated blood; the liver and spleen both normal externally, but somewhat softened, and filled with dark, liquid blood. The œsophagus was congested. The stomach, at the cardiac end, and along the greater curvature, and half way up each side, was discolored externally, dotted over with ecchymosed-looking patches, giving it a mottled appearance. It contained two or three ounces of a light-

colored liquid, which had a slight odor of chloroform. At the cardiac end, internally, and along the bottom, nearly to the pyloric end, the mucous membrane was of a dark-red color, softened, and easily peeled off with the thumb-nail. Up the sides, it was of a brighter red, speckled appearance, and not softened. The intestines were healthy. Circumstances prevented the extension of the examination, which is much to be regretted. The reporter of the case closes with the following remarks: —"Recoveries are recorded from drinking two ounces, or even more, of chloroform, but active measures were used—as the stomach-pump, emetics, stimulants, internal and external artificial respiration, galvanism, etc. As an internal stimulant, the spirits of ammonia, or the carbonate of ammonia, is the best. Very dangerous symptoms have been produced by half an ounce, and death has been caused by one ounce, Dr. Stille says:—'When death has been produced by the internal use of chloroform, its local irritant action has evidently been the chief cause of the fatal result.' In this case, death followed too soon to have been produced in this way. It was more probably caused by the action of the poison on the blood and the cerebro-spinal system, as in prolonged inhalation of the vapor. A peculiarity of this case, is the shortness of the time between taking the chloroform and death, as compared with other fatal cases reported."—*Chicago Medical Examiner.*

New Anaesthetics.—Dr. A. E. Sansom, at the close of an article upon the action of the tetrachloride of carbon, which he introduced to the profession as an anæsthetic, sums up the result of his experience thus:—"From what I have now said, it will be gathered that I do not consider the tetrachloride to be the *summum bonum* of an anæsthetic. So far as its earlier stages are concerned, it is all we want: it is stimulant, anodyne, hypnotic, and it produces no adverse sign. But for the anæsthesia necessary for the performance of surgical operations, as well as for any prolonged employment, I consider it altogether undesirable. The accidents of its physical condition, its ponderous vapor, its insufficient volatility for the system readily to disembarrass itself of it, are so many reasons for its non-employment in anything like large doses." Of his experiments in cor-

recting its bad effects by mixture with chloroform, in various proportions, he says:—The conclusion to which I have come from my experiments has been that, the greater the proportion of the tetrachloride, the greater the tendency to spasmodic, jerking inspiration, and the greater the tendency to a deepening of the narcosis after removal from the atmosphere. A small proportion of the tetrachloride seems to me to lend safety to the action of chloroform. On this point we want further experiments; but I think we shall find a mixture of one part of tetrachloride of carbon in six of chloroform a safe, as it certainly is an agreeable anæsthetic. Apropos of anæsthetics, Dr. Richardson announces the bi-chloride of methylene, $C_2 H_2 Cl_2$, to be an anæsthetic far superior to chloroform, in that it equals or surpasses its advantages without its dangers.—*Medical Gazette.*

Aluminium—Its Properties and Uses.—The discovery of this metal dates back only to 1827, when Wohler, a German chemist succeeded in extracting it from clay. It is a white metal, not like silver, but having a bluish tinge. Its specific gravity is from 2.5 to 2.67 according to its purity. It is considerably lighter than flint glass, being, as seen above, only about two-and-a-half times heavier than water. Bulk for bulk it is four times as light as silver and a little more than quarter the weight of copper. It is nearly as hard as iron, but can be softened by annealing; has great rigidity and tenacity; can be turned, chased, and filed with ease, never clogging the file; and can be drawn into wire as fine as a hair and rolled or beaten into sheets whose thinness can be surpassed only by those from gold or silver.

For mustard and egg spoons it would be an excellent material, as, unlike silver, it is not affected by sulphureted hydrogen or other sulphureted compounds. It retains its lustre in the ordinary atmosphere and is not affected by boiling water, diluted sulphuric, or strong nitric acid, which attacks silver, but has no action upon aluminium when cold, and it is not affected when plunged into melted niter, potass, or sulphuret of potassium, a test which even gold or platinum cannot withstand. It is dissolved, however, in muriatic acid and has a powerful attraction for chlorine.

It has been used in France and England for ornamental pur-

poses, as finger rings, brooches, chains, etc. A cup made of it, although very thin, was not indented by falling from the hand to the pavement, These peculiar properties would seem to make it a proper material for light field guns, cuirasses, helmets and coins, but for the cost of extracting it from its earthy base of argil or clay.

When the inventive genius of man has discovered a cheap and rapid process of extracting aluminium we may expect it to assume a much more important position in the useful, as well as the ornamental arts, than it occupies at present. A beautiful compound is now manufactured in France and England composed of aluminium 10 and copper 90 parts. We have seen a paper cutter, the blade and handle made of this, which had a beautiful yellow or deep straw color, was elastic, tough, and of a very fine finish. Its color is more grateful to the eye than gold and its lustre brilliant. The earth metals, of which aluminium may be considered the head, will in time become as valuable for use as they are now for ornament or for the purpose of the chemist.

BIBLIOGRAPHICAL NOTICES.

The Physician's Hand Book for 1868. *By William Elmer, M. D. W. A. Townsend and Adams, publishers, New York.* Contents.—Index to Diseases, Classification of Diseases, Ready Methods in Asphyxia, Poisons and Antidotes, Diagnostic Examination of the Urine. Pulse: Table of, etc. List of Incompatibles, Med. weights and Measures, Abbrev. of Med. Prop. of Remedies, Table of Signs and Abbreviations, Materia Medica, Index of Remedial Agents, Art of writing Extemporaneous Prescriptions, Record of Practice, Calender for 1868, Names and Addresses, Bills and accounts, Record of Practice and Treatment, Table of signs for Daily Practice, Obstetrics and Diagnostic Records, Obstetric Calender, General Remarks.

The Humboldt Medical Archives.—We wrote a notice of this new candidate for professional favour for our last number, but our printer managed to lose it. We therefore now take occasion to say that it is a very handsome periodical, and edited with decided ability. Its editorial corps is made up of the faculty of the Humboldt Medical College. Its contents are interesting and varied, and the journal is in every way worthy the favourable consideration of the profession.

EDITORIAL DEPARTMENT.

Absorption of Medicines by the Skin—We published recently some results of experiments on absorption in which the various surfaces were considered in reference to their capacity of admitting medicinal agents into the circulation. In the paper of which we gave an abstract, it was assumed that iodine made its way into the circulation through the mucous membrane of the bronchial tree, because so little was taken up from solution.

A series of experiments has recently been performed by Dr. Roussin, still further illustrative of cutaneous absorption. After immersion of an hour or an hour and a half in a bath containing 500 grammes (1 pound 1⅝ ounces of av.,) of iodide of potassium he detected no trace of iodine in the urine. If, however, he suffered the solution to evaporate spontaneously upon his skin iodine soon made its appearance in the urine. It was never taken up from solution but always in the dry state, when thin from the evaporation of the solution or from friction with the dry powder.

Dr. Roussin finds the reason for this in the physical condition of the cutaneous surfaces. This is always more or less oily and no amount of soaping effects more than a temporary abstersion of this natural grease for the simple reason that the sebaceous glands are constantly forming fatty secretion. Hence water will not easily wet the skin, but extends over it in drops. Of course, this greasiness repels the water, and with it the substances it holds in solution, the pores of the skin following the universal rule of all capillary tubes. It is now easy to see why mercury and iodine are so readily introduced into the circulation when applied as unguents. The fat which contains them finds pores in the exact condition required for its admission. So too the dry powder rubbed on the surface forms a sort of unguents with the free fat, and then readily passes into the face.

Prof. Edward Warren's Surgical Clinics—Prof. Warren of the Washington Medical College of this city, has extended an invitation to the Students of the Baltimore College of Dental Surgery to attend his *Surgical Clinics* during the entire session of the College. This favor from Prof. Warren is highly appreciated by both the Faculty and Students of the Baltimore College of Dental Surgery and will prove of great benefit to those interested.

Reproduction of the Crystalline Lens.—M. Milliot has shown that the crystalline lens is often reproduced after removal from various animals. Similar experiments were tried over forty years ago with the same results.

Errata—In the first part of Dr. H. F. Bishop's Address on *Rise, Progress, &c. of Dentistry*, in November No. of Journal the following typographical error occurs on Page 350, "Musseer" for "Monsieur."

DENTAL DEPOT.

JANUARY, 1868.

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ORIGINAL COMMUNICATIONS.

ARTICLE I.

A Lecture on Caries and Necrosis of Bone,

Delivered Nov. 15, 1867, at the Baltimore College of Dental Surgery,

By H. R. Noel, M.D., Professor of Physiology.

Gentlemen:

We have before us to-day, the very delicate operation of critical analysis; we wish to examine carefully and minutely Dr. L. S. Beale's Theories of Caries and Necrosis of Bone. We have given you his views of the *structure* and *developement* of teeth and of bone, that is, his physiology.

Dr. Beale's Physiology is so far good—very good; but his Pathology is bad, very bad,—his Aetiology is worse than bad—it is false.

A single glance at the anatomy of bone and we will begin the analysis.

You remember the Ossicle or Haversian system; the canal of Havers; the concentric laminæ:—the concentric lacunæ; the radiating canaliculi. You remember these as characteristices of *dry bone*, but recent bone has a blood-

vessel in the canal of Havers—germinal matter in the lacunæ—and nutrient fluid or pabulum in the canaliculi. Hence a nutritious fluid circulates in every direction through bone.

Now here is "Dr. Beale's Theory of Caries" as given in his work called—Structure, Life and Growth, pp. 145.

"In *Caries* the "germinal matter" (in the lacunæ) of a part of a bone receives too large a supply of nutrient matter, it grows too fast and lives upon the surrounding tissue which has been already formed."

This, taken from the same work, is his Theory of Necrosis.

"In necrosis the death of the germinal matter of many lacunæ takes place. It is easy to conceive that such a result must ensue if the supply of blood be cut off, for the currents of fluid, which during life permeated every part of bone cease, and the entire mass which has been affected by these changes must die."

We acknowledge that it is remarkably easy to conceive *all of that,* and to conceive more than that; we conceive what Dr. Beale does not state, perhaps not conceiving it himself, that *death* of the *germinal matter* in those *lacunae* might take place while the *full amount of blood* still *circulated around them.* After the death of the germinal matter however, we apprehend that the circulation would cease, even though all the vessels were open.

But more of this presently. Notice here, that caries and necrosis according to Dr. Beale, proceed from diametrically opposite conditions. Caries proceeds from too much pabulum; necrosis proceeds from want of pabulum. Again.

"Immediately around this (necrosed bone) the nutrient matter would flow more freely, but of course less regularly. In consequence the germinal matter of the neighboring lacunæ would grow much faster, and thus a number of granular cells result. These would even *eat away* as it were, but of course very slowly the dead bone, which soon becomes surrounded with such cells."—Idem p. 146.

So *necrosis produces caries* you perceive. Notice here also that the increase in germinal matter—cells, &c., around the necrosed bone, is not because the dead bone

acts as an irritant or excitant but because of the increased amount of fluid that now passes *around* but once passed *through* the dead bone. The increase in quantity of nutrient fluid, necessarily determines the increase in amount of germinal matter, according to Dr. Beale.

Now we believe this theory of caries, and the explanation of the pheuomena attending necrosis, to be absolutely fallacious in every particular. To be one series of unfounded assertions.

1. It is not philosophical; for philosophy investigates causes and effects and in assigning to any given effect its appropriate cause, it first proves its invariable antecedent relationship;

2. That *it is* appropriate. 3. That it is adequate to the production of this effect.

Now Dr. Beale has assigned too much nutriment as the *cause* of caries, and yet he has failed to establish its invariable antecedence, has nowhere shown that pabulum *is* really in *excess;* or *why* it should be in excess; or if really in excess, *why* it should produce this effect.

He assigns a cause and does not even attempt to show that it is always present; or that it is appropriate; that it is adequate. He does not even prove by the analogy of the operation of like causes in other tissues, that this effect should ensue from such a cause.

He proves nothing—he assumes everything—and then asks us to believe it. Which we emphatically decline to do, as the assumption of premises and deduction of conclusions therefrom, is not our idea of scientific reasoning.

It is in its very nature improbable.

The essence of this theory involves two propositions, neither of which we admit.

1. Proposition.—That germinal matter although too freely supplied with pabulum, yet makes a parasitical attack upon tissues already formed and literally eats them up.

If *too* freely supplied with pabulum why does it attack

the formed tissue? Why does it with a surplus of nutrient material, yet wage a war of extermination against the very tissue it ought to produce and has been producing? Why with an abundance of food, does it devour its own offspring?

Is this cannibalism a characteristic of the germinal matter of bone only,—or is it true of germinal matter wherever found?

1.—Has germinal matter the power of decomposing formed tissue into its chemical elements, and recomposing these into pabulum. 2.—Or has it the power of transforming formed tissue into pabulum direct. 3.—Or has it the power of transforming formed tissue back into germinal matter direct?

If it *feeds* upon formed tissue it must do one of the three—which is it?

It may have such a power—but Dr. Beale has nowhere else assigned such to it; and we deny that he has the right to claim for germinal matter here, a power, which he has never granted it before.

We all know that tissues die, decay, moult incessantly, and are destroyed in exhibition of the different vital phenomena, and that they return to their ultimate elements, through chemical compounds formed in obedience to their chemical affinities; that these results of waste and decay are rapidly conveyed away by blood-vessels and eliminated by the proper organ; but that these tissues should be attached and devoured by the very *material* which *nature intended* for *their production*, is to our mind in the highest degree improbable.

Germinal matter therefore in the role of the parasite we cannot endorse.

2. Proposition—That germinal matter has the *power of transforming* but not the power of *refusing* to transform pabulum.

Now we assert that germinal matter has the power of refusing to transform pabulum, and this depends upon the "Law of *Limited* Vital Force."

If comparative anatomy teaches any one truth throughout its entire range, it is the truth of the limitation of vital force. Examine the whole animal creation, and you will find that, for classes—orders—tribes—families—genera—species—varieties and even for individuals, the amount of vital force is definite—determinate—circumscribed. Form—size—strength—intelligence, &c., are accurately and invariably apportioned to each, and by these are they characterized, distinguished and classified.

No superabundance of food or pabulum can change, or vary them except to an extent limited indeed.

This same law of limitation holds equally true in regard to the anatomical structure of all animals ; for the organs are limited in size—the tissues are limited in size, even down to their ultimate anatomical forms, such as the fibrillæ of muscle and ultimate nerve tubules, &c. They are all limited, all determinate in size and even the germinal matter itself never assumes a size larger than 1.1000 of an inch in diameter, no matter how great the amount of pabulum it receives.

Dr Beale grants it the limited size, but refuses it the power of limiting quantity.

The same power that limits the size of animals, size of organs, size of tissues, size of germinal matter, also limits the quantity of germinal matter produced, though there be excess of pabulum. Dr. Beale's theory that pabulum in excess, *necessarily* determines the rapid production of germinal matter, instead of *allowing* the *formation* of proper tissue, is not sustained by the history of the animal race.

The definite size of animals, of tissues, of even the minutest microscopical anatomical elements, give us the irresistible conclusion, that as the formed tissues are definite in size and quantity ; as germinal matter itself is definite in size, and as the tissues are formed from germinal matter, *then* must the quantity of germinal matter be definite also, and the amount of pabulum consumed definite, regardless of the amount present.

Then germinal matter *has* the *power* to *refuse* to transform pabulum.

Germinal matter *must* certainly have the power of refusing to transform pabulum when in excess, otherwise wherever over the whole system pabulum may be in excess, we must of course have all of the phenomena of caries, i. e. germinal matter living too fast and preying upon the surrounding tissues.

For Dr. Beale says germinal matter is the same everywhere, and of course the same effects must ensue where the same cause operates. But this theory is not sustained by the phenomena seen in the animal economy.

If germinal matter when living too fast, preys upon or consumes the formed tissue of bone, it certainly does not serve all tissues in the same way.

You remember in the lectures upon mucous and pus (Chamber's Renewal of Life,) we cited Dr. Sanderson of St. Mary's Hospital, London; Dr. Forster of Wurzburg; Buhl of Munich as authorities to prove that germinal matter could pass through the epithelial cells without injuring them; in fact, that purulent catarrh, diphtheritic membrane, &c., might exist, yet not the slightest change be found in the epithelial coat. The germinal matter that formed the mucus, pus, membrane, &c., must have come through the epithelial coat; and certainly did increase rapidly in quantity; and yet it *did not feed* upon the epithelial or formed tissue.

Why should it do so in bone?

Again—Buhl found that in some instances the epithelial coat was disorganized, broken up, eroded, &c., but he could not assert that the *germinal matter* had caused this, for in the previous cases it had left that coat intact, and to say that now it did destroy the coat would be a mere assertion. He could not prove that it fed upon the coat. Now in many of these cases the formed tissue, i. e. epithelium was perfect, yet the cases surely present the very symptoms characteristic of caries; that is, there was a rapid

increase of germinal matter, and the formed tissue *should* by analogy have been preyed upon or eaten up, but it *was not*.

So germinal matter may live too fast;—increase too rapidly in quantity; pass *through* formed tissue, draw its nutrient fluid through formed tissue and yet, leave the *formed tissue perfect*.

Now why should it *consume* the formed tissue in bone? The opposite action in the two cases would seem to require explanation, but we defy you to find anything in Dr. Beale's work, which will harmonize the two. As one is the result of direct observation of several, and the other the mere theoretical assumption of *one man*, we do not hesitate which to reject.

(To be Continued.)

ARTICLE II.

On our True and False 'Knowledge' of the Physiological Character and Action of the Red-Blood Corpuscles.

By Rufus King Browne, M.D.

It is still said to be doubtful whether the corpuscles consist of red-liquid enclosed by a membrane or not, but recent researches have left not the slighest basis for a reasonable doubt upon that point, but unequivocally and imperatively ratify every observation of its non-membranous form, by showing precisely what function it performs, and thus making it indubitably evident, that the existence of membrane or wall is entirely incompatible with the performance of that function. This function has long been suspected to be the carrying of oxygen throughout the animal body. During its passage through the lungs, the whole blood, as every one knows, taught by innumerable experiments which establish the fact, loses carbonic acid and takes up oxygen.

Every one hundred volumes of blood, which enter the lungs are capable, according to Claude Bernard, of absorbing twenty-one volumes of oxygen. This is about seven times as much as an equal quantity of water could dissolve, and it has been shown that serum which differs but slightly from the blood fluid, was hardly superior to water in this respect. Consequently, it is evident that the great mass of the oxygen must be attracted by the blood corpuscle, and that it surrenders nothing of itself with the oxygen it delivers.

It has therefore been generally assumed, though it was not proved, that the substance of the corpuscle was capable of combining with oxygen in the lungs, and afterward of giving out that oxygen again, in small doses, to the substances it came in contact with. This has now been unequivocally demonstrated to be the case, and it is exclusively upon this demonstration we rely, to establish 1st, that the red blood-corpuscles alone appropriate the oxygen. 2nd, that they yield this to the plasma in the round of the circulation, and 3d, that they return to the lungs to take a fresh supply, which again is distributed and so on: and, lastly, that the characteristic action of the corpuscles in this transaction is one which demonstrates its vivid character and function.

Hoppe-Seyler first recorded the curious fact, that when a ray of white light passes through a solution of red-blood, and is afterwards decomposed by a prism, two dark bands make their appearance in the green portion of the spectrum. Stokes repeated and verified this observation, and made it the starting point of a new, exhaustive and decisive train of research.

He treated a solution of blood *corpuscles* with an alkaline reducing agent, and observed that its color instantly changed, from a scarlet to purple red, the hue of venous blood. On examining the spectrum of this, he found that the two dark lines had disappeared, and that a single line only, intermediate in position between them, had became

visible in the spectrum. On shaking the tube with air, the scarlet color, and the two lines at once returned, but, after a few minutes again *disappeared*, and this could be repeated many times. Hence it was evident that the scarlet arterial blood repeatedly lost its oxygen to the reducing agent, and subsequently recovered it again, then shaken from the air ; thus undergoing the precise variation in color, the change from light to dark, through which it regularly passes in the circulation. This experiment shows that the purple of venous blood is *not* due to the existence in the red-globule of carbonic acid gas,—neither from the oxidation of its own substance, as embodied in one of our suppositions, nor from its taking up carbonic acid gas *not* of its own substance, whether from within or from without the blood. It shows, further that there are not *two* changes of color accurately stated, but only one, namely, that from purple to scarlet, and that is dependent on the gain of oxygen. It shows also that it is the *loss* of the oxygen it absorbed, and not the *absorption* of carbonic acid, which causes the cessation of the scarlet.*

This matter of the red blood corpuscle, always called its coloring matter,—is different from the so-called hematin, which is obtained by artificial means, from the blood. In the oxidized—the SCARLET state—it is distinguished as *scarlet cruorine*, and in its second state, it is *purple cruorine*. The two conditions are simply those in which it holds different quantities of oxygen. It it hardly necessary to point out how very striking and conclusive an explanation these facts afford of the oxygen-carrying capacity of the red blood corpuscles. They remove all obscurity as to precisely what constituent of the blood it is which performs this office, and they demonstrate that it is exclusively those bodies which take up the oxygen. In the

* This experiment is very instructive, for it shows the *hue* of venous blood, or its corpuscles, is not a new *color*, but is simply the organic hue of its substance and form, which is *not* another color, but the basis of the change to scarlet caused by the impletion of oxygen.

lungs the substance of the blood corpuscle, the *purple cruorine* of venous blood—takes up oxygen and becomes scarlet or arterial cruorine, and in the systemic circulation this oxygen is given up to the plasma, and the substance of the globule the *cruorine*, passes into the purple state.

But of this latter fact, a second demonstration actually exists in another experiment of Stokes. And this experiment shows that the blood globules have also the power of discharging their oxygen into the midst of the other blood substances, i. e. the plasma. In this experiment a solution of the blood corpuscles from arterial blood—a solution that is of scarlet cruorine—when excluded from the air and the access of oxygen, shortly *reduced itself*, or parted with its oxygen to the serum and became purple cruorine. But some reader may be inclined to inquire, do these experiments really show that it is the corpuscles and not the plasma, which take up the oxygen? To this we answer that proofs, not alone perfectly conclusive, had led us to the belief,, that the former took up the oxygen at the lungs, long before these actual demonstrations of the fact.

First, in these demonstrations it is shown that the substance of the corpuscle *will* and invariably does take up the oxygen from the air quickly, almost instantly, and gives it out *some time* afterward. This fact perfectly accords with the physiological phenomena of their taking up oxygen in the body, from the air in the lungs. Here the red blood corpuscles literally crowd the pulmonary capillaries, almost to their distension and the exclusion of the plasma, and when coming directly from them, are found to be abundantly supplied with oxygen.

Second, this oxygen if looked for in the same corpuscles of venous blood is wanting; and this alternation may be repeated any number of times. This fact was re-demonstrated by opening the tube and shaking it with air; when the scarlet color returned, and with it the two lines of the spectrum. In these experiments it is proven that the

scarlet cruorine is capable of yielding the oxygen it holds to a portion either of the serum or the plasma, either of them hardly superior to water in the amount of oxygen *they* can *take up*. This action of the red-corpuscle,—of its substance the cruorine, in taking up under certain conditions, the oxygen and giving it up afterwards, to the substances of the liquor sanguinis, is one of a character—(give and take)—so invariably characteristic of organized *animal substances and processes*, that I must particularly dwell upon it.

We have seen that the notable phenomena of change of color in the blood, makes or signalizes a change in the substance of the globule, due to its appropriating the oxygen of the air, but that this change *does not last long*; that its duration is only up to a certain point in the blood channels and that from thence until the globules resume their situation, in the lung capillaries, the change was remitted. Now, here is a plain statement of a *fact*, and looking at it in the ordinary way, that is, without any exercise of rational intelligence, as a horse regards the landscape, or the sky, or his fellow horse without the slightest intelligence of the truth in either case not *seen* by the eye, we would be ready to say; that there was no difficulty in understanding and explaining the phenomena, in accordance with the ordinary theories of oxidation, and that the oxygen had oxidized the globule, and afterward left it. But then this statement plainly proves how total our *un*-intelligence is about the phenomenon,—how completely we leave unappreciated and mentally unseen, the true character of the transaction. The statement we have supposed to be made, is in two halves neither one of which can possibly be true if the other is. The one supposes the access of the oxygen to be oxidation. But the second part of the supposition is that the oxygen disengages itself. Now the impossibility of this second occurrence, consistently with the first as oxidation, proves the fallacy equally of both parts of the supposition. Oxidation pre-

supposes the *union* of oxygen with particles of some other substance.

This, and nothing else, is what determines the exact character of oxidation. Now what kind of oxidation is it in which this union does *not* take place? What kind of oxidation is it in which the very characteristic of the phenomenon lies in the complete after separation or disengagement of the oxygen, subsequent to its engagement in the lungs? Can it be rationally said that this disengagement is an *act of* the oxygen? Can it indeed be said, that the act of taking it up and discharging it, has anything in it characteristic of oxidation except the physical character of the oxygen? Of course in saying that the case in question is not one of oxidation, we do not mean a negative, or, that it is a case in which no phenomenon, in which oxygen takes a part occurs, for instance, a case where oxygen is present with other substances subject to chemical change, and yet takes no part in changing them. No, what we mean, plainly enough is that admitting oxygen to *take part* in the process of arterialization, it yet performs no such part as in *oxidation*.

Undoubtedly, arterialization implies, *not* a change in the substance of the oxygen,—and that it takes part in the transaction, as it takes part in oxidation; but what it shows in which it differs from oxidation is this, that its power of appropriating to itself, or uniting with, at the expense of the integrity of their substance, other inorganic substances, is not in force on the substance of the globule, because unlike others, that substance has itself an *organic* power; and this latter power it is which provides that the peculiar activity of the oxygen, which ordinarily ultimates in oxidation shall be neutralized. But the difference we here point out is not that between two different physical traits or characters, but a difference between an *organic character on the one side, and of a physical* character on the other. But the reader may enquire, whether the oxygen is really disengaged from the globules. The ex-

periments already cited prove that as venous cruorine or corpuscle substance will take up again, and again many times, oxygen from the air in contact with it, becoming each time arterial cruorine, so the latter if completely excluded from the air will soon give up its oxygen to the serum, thereby becoming venous cruorine. But this disengagement now questioned, has been all along explicitly affirmed by the supposition that the globules yield oxygen to the tissues. That they *yield it*, is as explicitly stated in this long-credited supposition, as it is by us. But we have been forced to abandon the idea, *that it is* to the *tissues* the oxygen is yielded. For the nature of the case is such that the tissues cannot receive it from the globule as transferred by contact, but only *from* the plasma or serum,—the exudate which *does* permeate the tissue. Our statement is the same as the supposition long existing that the globules do yield their oxygen, on their round, but rather than that they do so *to the tissues*, we say they yield it regularly throughout their round to the plasma,—the fluid in which they are suspended. The running anatomical and physiological conditions are such, as to show our statement to be the truth, for it is impossible that the globules can leave in their track in their rapid motion, a train of particles of oxygen, free to penetrate the sides of the vessels and permeate the tissues to the right and left, uncombined.

Such a notion belongs to a day of study, when our intelligence had not yet *come to the birth on* the subject. It implies what we know is not true, namely, that the oxygen leaves the corpuscles, traverses the walls of the blood-vessels, and arrives at the comparatively distant fibres of tissue, in an *un*combined state. Whereas to the least exercise of intelligence it is plain that the substances of the liquor sanguinis are in perfect contact with the globules, the former actually forming a coating for each of the latter, and the disengagement of the oxygen must be to the substances in the plasma. However, it has been demonstrated, that there is no *free* oxygen in the vessels, since pyrogallic

acid, which is notable for combining freely with free oxygen, when it is injected into the veins, will pass out of them without undergoing oxidation. This actual delivery by the corpuscle of oxygen, elsewhere than where they received it, is implied in every supposition.

But to return to the heart of our subject. This transaction of the globules, is one in which they are the real *agents*, in which they do the *work*—a work which is similar in its organic character to the appropriating and discharging work of the various anatomical elements of the organism, and most notably of its cellular elements. This consists in their *doing* something and not in their being acted upon by some disintegrating substance, whose character lies in its *physical power*. The distinction between these two reaches its highest, in the blood corpuscles. Accordingly there is nothing at all beyond our present knowledge, to an active intelligence, in the assertion, that while the oxygen contributes its physical substance, and the ingoing and outcoming are its physical conditions, the globules do the specific organic work of arterialization. They appropriate the oxygen and yield it with equal facility. The liquor sanguinis cannot do this but is dependent on the globules for all it has. And the physiological relation of the two is such as to show that this could not possibly be done in any other way. Estimating the mere fraction of oxygen the plasma by itself in quantity will take up, as compared with the corpuscles, and that in the capillaries of the lungs the proportion of plasma to globules is much less than elsewhere, no supposition could be more distant from the truth, than that which supposes "the plasma to first take up the oxygen and then give it to the corpuscles."

[*Flint. Hum. Phy.*—"The plasma *first* takes up the oxygen and gives it to the globules."]

What can all this be, but proof actual and positive, that it is the globules themselves which take up this oxygen, and give it out again to the fluid they are suspended in,

somewhere in the round of that fluid between the points in the circuit, where they are found to have it, namely, the arteries, and where again they are found to have lost or *discharged* it to the fluid in which they are suspended, namely, the plasma, to combine with oxidable materials, therein. What other reasonable notion do the facts admit of? None whatever! Is it for instance conceivable that the fluid of the blood takes it up in the lungs, immediately gives it to the globules to be again instantly surrendered by them to that fluid.

The bare supposition is absurd and contradictory; to say nothing of the facts being precisely otherwise. Shall we maintain the supposition, both prohibited by facts, and contradicted by *other* suppositions, that the red-blood globule does not *disengage its oxygen*, but retains it to the last, becoming in part oxidized, or decomposed with loss of substance,—or carbonic acid-*ized?* In that case let us confront *this* with another supposition, viz.: that the red-blood globule does lose or deliver oxygen in its capillary round and "*takes up* carbonic acid;" or that other supposition that the red blood corpuscle "consumes oxygen and "*gives off*" carbonic acid:" or, what explicitly contradicts this, namely, the other supposition, that the venous color of the red-globule is due to the carbonic acid of the blood, which seeing that the color is due to the corpuscle must according to this supposition be in them,—the latter according to the last prior supposition being what it "gives off" in the blood. All these we discover have the merit of being in flagrant contradiction each of every other. Still more the supposition relating to the corpuscle giving off carbonic acid, can *not* mean given off in the lungs, for another supposition states that the carbonic acid *there* is displaced from the plasma by the oxygen, which plasma is said to "first take up the oxygen and then give it to the globules," which latter according to this supposition, arive at the lungs without having carbonic acid.

The *fact* being, that the plasma cannot take up more

than 1-15 of a supply of oxygen for the globules. What do we make of the fact that they take oxygen up instantly and subsequently discharge it much *less quickly*, as shown in the experiments? I emphasized the word discharged above, for what in my estimation demands the most lively and absorbing appreciation is, the part directly played by the globule, as shown by these experiments, in this transaction. For this is a part in which the globule is not the *patient*, but the true agent.

The act is invariably described as one of "oxidation," and it is owing to an inveterate, because wholly inconsiderate habit, of pronouncing it one of "oxidation," which designates it as a *chemical* process,—that we have such very infirm notions about it. This may have been excusable while we were wholly misinformed as to precisely in what connection the oxygen entered the system, and by what substances it was transported to the tissue supplying blood; while indeed, we thought the oxygen upon reaching the blood, by a process of "diffusion," entered at once upon a course of *chemical action*.

(To be continued.)

ARTICLE III.

Dental Notes on the late Civil War.

By W. Leigh Burton, Richmond, Va.,

Dental Surgeon in the late Confederate Army; Secretary of the Virginia Dental Society.

In contributing this or similar articles to the dental literature of the day, the writer wishes it to be understood at the start, that he is not doing so with the view of keeping up or encouraging any sectional feeling or rancor. Narrow-minded bigots or fanatics may discover evidences of disloyalty or rebellion in them, but his real purpose is to place upon record, facts and incidents con-

nected with dental surgery, precisely as if he had been writing of the English, Austrian or Feejeean army. No one, it is presumed, can be so incredulous as to dispute the fact that, at no very remote period, Confederate armies *did* exist; that they were commanded by officers of fair ability; that they lost and won battles; captured and exchanged prisoners; were provided with hospitals for the treatment of sick and wounded soldiers; and that a good many of them died; and some lived "to fight another day." Nor can it be denied that the failure of the Southern states to attain a separate nationality, was owing mainly to the scarcity of men and the materials of war—these matters having become a part of the history of the times.

The drawbacks caused by the scarcity of men and the materials of war were felt in every department of the Confederate government, but in none more sensibly than that in the medical department, and associated with it, that of dentistry. Medicines and surgical instruments having, at the commencement of hostilities been declared contraband of war by the United States government, it is not to be wondered at that the Confederates stood sorely in need of the most essential remedies in the materia medica. To depend upon running the blockade was but a precarious business at best; and the laboratories established at Charlotte, N. C., and other points, while they were able to supply chloroform, ether, and other medicines of tolerably fair qualities, were totally unable to furnish quinine and other rare and valuable remedies.

It should be enough to refute the charge of inhumanity so often brought against the Confederate authorities to state that the medical department, particularly, used every available means to remedy the evils caused by an inadequate supply of medicines of Northern and foreign manufacture. In the year 1863, Surgeon F. P. Porcher, by order of Surgeon General Moore, prepared at the expense of great labor and research, a book which tended

greatly to alleviate the inconveniences arising from an insufficient stock of medicines. The writer has before him a copy of this rare and valuable work. It is entitled, "Resources of the Southern Fields and Forests, Medical, Economical, and Agricultural. Being also a Medical Botany of the Confederate States; with practical information on the useful properties of the trees, plants, and shrubs." Attached to the book is a "Standard Supply Table of the Indigenous Remedies for Field Service and Sick in General Hospital."

The fact of the publication of this book is known to but comparatively few persons at the South, and from its great scarcity, it is doubtful if a copy of it is to be found among the archives of the "rebellion" at Washington city. Almost every conceivable subject indicated by its title is treated of. Not only are full directions given for the preparation of medicines, but the same careful instructions are laid down for making certain kinds of cement or for the management of silk worms.

Concerning the scarcity of men for field service, it was not an extravagant metaphor of General Grant's when, towards the close of the war, he telegraphed to the authorites at Washington that the Confederates were "robbing the cradle and the grave." As bearing upon the need for men and relating also to operations in dentistry, the following circular is published:

WAR DEPARTMENT,
Surgeon General's Office,
RICHMOND, VA., *Dec.* 3, 1864.

CIRCULAR
No. 22.

To Medical Directors of Hospitals.

I. Soldiers who have lost the hand or arm and otherwise healthy, but are incompetent to perform clerical duty, can, in the use of a pistol, act as efficient guards for Hospitals and Purveying Depots. The majority of the guard can be composed of such men. Medical Directors of Hospitals will ascertain the number of Dragoon Pistols needed for this purpose in the Hospitals under their charge, and make requisition accordingly upon the Ordnance Department in Richmond.

II. Dental Surgeons are required to make monthly, to this office, to be forwarded by the 5th of the month through the Medical Director, written reports, in which will be noted in separate columns, and separately for each hospital, the number and character of each surgical operation performed during the month.

(Signed,) SAM'L PRESTON MOORE,
Surgeon General C. S. A.

It is presumed the "Dragoon Pistols" referred to in paragraph I, must have been *self-cockers*, for had they been of the ordinary army pattern, it is difficult to understand how they could have been made available in the *hand* of a one-armed man.

At the commencement of, and during the war, there was only one firm in the South engaged in the manufacture of gold foil and dentists' materials—Messrs. Brown and Hape of Atlanta, Ga. Owing to the rigid conscription laws passed by Congress, the principals and employees of this establishment were conscribed at an early period, and consequently its operations ceased; until through the intercession of the surgeon general and the entire dental profession, they were exempted from military services. They had scarcely resumed operations, however, when they were forced to remove to Augusta by the evacuation of Atlanta, by the Confederate forces. But misfortune seemed to cling to these enterprising gentlemen. One of the firm having received a permit to purchase machinery and materials for the manufacturer of gold foil, abroad, was about entering a Southern port, when the ship was wrecked and everything on board went to the bottom of the sea!

It was not only gold foil that became scarce and high priced, but soon after the assignment of dentists to duty in hospitals, the supply of files become entirely exhausted. All efforts to obtain them through the blockade having failed, the medical department determined to try the experiment of their domestic manufacture, and consequently the following requisition was made.

CONFEDERATE STATES OF AMERICA,
Surgeon General's Office,
RICHMOND, VA., *Febr'y* 23, 1865.

GENERAL:

I respectfully request the privilege of procuring from your Department two lbs. of sheet steel, for the purpose of manufacturing files for operations on the teeth.

Very respectfully,
Your ob. servant,
S. P. MOORE,
Surg. Gen'l C. S. A.

BRIG. GEN. GORGAS,
Chief of Ordnance,
Richmond.

Although a dentist's file had never before been made south of the Potomac, the success of this experiment was complete. It may be true they were not equal to Murphy's in point of finish and appearance, but nevertheless they answered every purpose admirably. The "two lbs. of sheet steel," referred to in the above requisition was required for files for the front teeth. The "knife edge" file had been successfully made before, and after it had been ascertained that every variety of the instrument could be made in Richmond, dentists were kept constantly supplied.

Upon the assignment of a dentist to a hospital, it may be said as a rule that, the surgeon in charge afforded him every facility in his power for his operating to the best advantage. A room with a good light, cold and warm water, soap and towels, and a servant or soldier, were invariably provided. The making of the operating chair was entrusted to the hospital carpenter, and generally constructed by a rude design drawn in pencil. A tin basin placed upon a bench or stool answered for a spittoon. In cold weather a good fire was kept constantly burning in the room—that is to say, when the hospital was supplied with wood.

Dental patients were divided into three classes: those from the front; the convalescent; and the sick. Those from the front were invariably treated first, in order that they might return to their respective commands. They

entered the hopital especially for dental operations and were discharged after the completion of them. If it was argued by some officers that men from the front made the requirement of dental operations a pretext for absence from their commands, in order to have a day's relaxation in the city, they generally paid for it by the loss of one or more teeth. And even if they relished the operation, there was but little opportunity afforded them for any other enjoyment. After being discharged from the hospital they were conveyed, under guard, to the "Soldier's Home," where they remained until the "Provost Guard" escorted them to their commands. These measures appear harsh, and while no doubt they were very necessary in some cases, many men were deterred from having the benefit of dental operations rather than submit to them.

Officers or men not registered in hospitals were not entitled to dental operations unless upon a special order of the Medical Director of the department, and they were never granted except in urgent cases. The form is here given :

MEDICAL DIRECTOR'S OFFICE,
Richmond,..............1864.

Surgeon Dentist...will admit
..for attention to teeth.

By order of Medical Director.

(Signed,) FRANS. D. CUNNINGHAM,
Surgeon.

Dentists were provided with ambulances to enable them to reach the hospitals as conveniently and with as little fatigue as possible. Many of the hospitals being at a considerable distance from the city, and the dentist having to carry his instruments and materials, this arrangement was eminently proper, as it is well known that it is impossible to perform any delicate operation after having carried in the hand for two miles or more, a parcel weighing several pounds. But dentists were not allowed this privilege

without an effort having been made in certain quarters to break up the arrangement. Some of the assistant surgeons having to walk to their posts of duty, became jealous of the privilege allowed dentists, and not only complained of it, but tried in various ways to have it discontinued. In a case of the writer's, the ambulance having failed to call for him at the usual hour, and being compelled to walk to the hospital, he was of course behind time. This apparent dereliction of duty was reported promptly to the surgeon in charge, and eventually went the rounds of all official papers until it became at last so filled with endorsations that it was positively frightful to behold. The point made against the offender was, that as many of the surgeons were in the daily habit of *walking* to the hospital, the non-arrival of the ambulance could not be received as an excuse for not being in place at the proper time. It is enough to say, however, that this little scheme failed most signally, and that dentists had the use of ambulances up to the last days of the Confederacy.

It is pleasant to turn from these little weaknesses of poor human nature to the contemplation of a noble and magnanimous character, such as the late F. W. Hancock, surgeon in charge of Jackson Hospital, possessed. It would be no fulsome flattery to his memory to say that he was a conscientious officer, a good man, and a gentleman in its fullest meaning. Many are still living to bless the memory of him, who while they were stretched upon a wretched hospital bed, racked with fever and pain, cut off from intercourse with home and friends, and dispirited by military reverses, have been cheered and comforted by his kind words and approving smile. Many, alas! who had tearfully looked into his kind face for some signs of a hope of life, went before him, and those acres of little hillocks near Holywood, attest to the fearful ravages of the grim monster!

Constantly besieged by executive business, and often being harrassed at not being able to obtain supplies, Sur-

geon Hancock, still found the time to give his personal attention to the minutest details of his immense hospital, having the capacity for the accommodation of ten thousand patients. In no department of his hospital did he take a livelier interest than that of Dental Surgery. He was fully alive to the importance of it as effecting the health and comfort of the men under his charge, and nothing was left undone by him which could possibly aid in its application to all who desired it. From the connection of the writer with some of the largest hospitals in the late Confederate States, it appears to him that before closing this article, he should have something to say upon a subject, about which, much apparent ignorance prevails—the supply of food.

Of course it would be quixotic in any writer to attempt to beat down the prejudices produced by the alleged barbarities practiced at Andersonville and the Libby. Still the truth may be told for all that ; and if it should be the means of changing to any extent the opinions of even a very small number of people, some good, at any rate, will have been accomplished. The writer states on his own knowledge, that at times, he has known the employees and attachees of hospitals to subsist for three weeks solely upon *corn bread and sorghum!* Think of matrons, ladies, who during other and better days had been accustomed to every luxury, living upon such miserable diet! Of course there were times when the fare was better, but it frequently happened that all lines of railway or the canal would be cut by a raiding party, when great scarcity of food would ensue. And how did the poor Confederate in the field fare? On canned meats and fruits, sardines, bologna sausage, and wholesome bread? Alas, no! Occasionally he may have revelled in the luxury of fresh meat and wheat bread, but more frequently—particularly during the last days of the Confederacy, his fare consisted only of corn bread washed down by "Confederate

than 1-15 of a supply of oxygen for the globules. What do we make of the fact that they take oxygen up instantly and subsequently discharge it much *less quickly*, as shown in the experiments? I emphasized the word discharged above, for what in my estimation demands the most lively and absorbing appreciation is, the part directly played by the globule, as shown by these experiments, in this transaction. For this is a part in which the globule is not the *patient*, but the true agent.

The act is invariably described as one of "oxidation," and it is owing to an inveterate, because wholly inconsiderate habit, of pronouncing it one of "oxidation," which designates it as a *chemical* process,—that we have such very infirm notions about it. This may have been excusable while we were wholly misinformed as to precisely in what connection the oxygen entered the system, and by what substances it was transported to the tissue supplying blood; while indeed, we thought the oxygen upon reaching the blood, by a process of "diffusion," entered at once upon a course of *chemical action*.

(To be continued.)

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By W. Leigh Burton, Richmond, Va.,

Dental Surgeon in the late Confederate Army; Secretary of the Virginia Dental Society.

In contributing this or similar articles to the dental literature of the day, the writer wishes it to be understood at the start, that he is not doing so with the view of keeping up or encouraging any sectional feeling or rancor. Narrow-minded bigots or fanatics may discover evidences of disloyalty or rebellion in them, but his real purpose is to place upon record, facts and incidents con-

nected with dental surgery, precisely as if he had been writing of the English, Austrian or Feejeean army. No one, it is presumed, can be so incredulous as to dispute the fact that, at no very remote period, Confederate armies *did* exist; that they were commanded by officers of fair ability; that they lost and won battles; captured and exchanged prisoners; were provided with hospitals for the treatment of sick and wounded soldiers; and that a good many of them died; and some lived "to fight another day." Nor can it be denied that the failure of the Southern states to attain a separate nationality, was owing mainly to the scarcity of men and the materials of war—these matters having become a part of the history of the times.

The drawbacks caused by the scarcity of men and the materials of war were felt in every department of the Confederate government, but in none more sensibly than that in the medical department, and associated with it, that of dentistry. Medicines and surgical instruments having, at the commencement of hostilities been declared contraband of war by the United States government, it is not to be wondered at that the Confederates stood sorely in need of the most essential remedies in the materia medica. To depend upon running the blockade was but a precarious business at best; and the laboratories established at Charlotte, N. C., and other points, while they were able to supply chloroform, ether, and other medicines of tolerably fair qualities, were totally unable to furnish quinine and other rare and valuable remedies.

It should be enough to refute the charge of inhumanity so often brought against the Confederate authorities to state that the medical department, particularly, used every available means to remedy the evils caused by an inadequate supply of medicines of Northern and foreign manufacture. In the year 1863, Surgeon F. P. Porcher, by order of Surgeon General Moore, prepared at the expense of great labor and research, a book which tended

and I was unable to account for it, never having met with a similar case. The plate being rather thin and weak and not vulcanized quite enough, I determined to do the work over, hoping by a new trial to obtain a better result. After leaving out the old plate for about a week or more, I obtained a new impression of the mouth and constructed a new set. I was careful to make it sufficiently low on the ridge, and to prevent it from encroaching upon the soft palate. From some cause or other I failed to get as good a fit in this as in the first set. The plate moved laterally, but at the same time required considerable force to detach it; yet it was evident that adaptation was not so perfect as before. At this stage of the operation I was reminded of a remark made by the patient and I considered the whole difficulty, attending the first plate, solved.

When she first complained of the set, she said she thought if it did not fit so "tightly" it would not cause her mouth to become sore. Now I thought this loose fit the very *desideratum*, and adjusted the set in my patient's mouth with a considerable air of triumph. But alas how often do our most sanguine expectations fall to the ground. I saw the patient again after a few days, and she said that her teeth were doing well, except that her mouth was becoming sore again. I did not consider this doing so well, and advised her to leave them out until the soreness disappeared. This advice she followed some time, and now experiences no inconvenience from wearing the set.

Soon after this I met with the patient of another dentist, who was wearing a full upper set on rubber inserted about eighteen months previous. She informed me that her mouth became very irritable soon after the insertion of the plate, but that it recovered gradually until now she wears the set with greater comfort, although a slight degree of soreness yet remains. Due regard has been paid to cleanliness, and there is no offensive odour about it.

Had she laid the plate aside from time to time, and not

persisted in wearing it when her mouth was in an irritable condition, she would doubtless have been well long before this; for in this case the fit was very good. A short time since I inserted a full upper set for a lady, and so easily is she nauseated, that the simple presence of the set in her mouth made her very sick; this, however, soon wore off but, in less than four days she complained of her mouth becoming irritable, not on account of the plate irritating the parts mechanically, but from the whole mucous membrane of the mouth becoming sore, and the soreness extending over the soft palate and into the throat; the parts remaining in this condition to the present time. The fit of the plate is very good, and the patient is in remarkably good health, living at one of the public watering places in South Alabama. I advised her to persevere in wearing the plate at intervals in the hope that the trouble will soon entirely disappear, and also recommended the use of an astringent mouth wash.

Now I ask, for I write for information alone, why does irritation of the mouth attend the wearing of rubber plates in certain cases and what is the remedy? May it not be from some peculiar idiosyncracy preexistent in the patient, requiring however, the wearing of this peculiar work to develop the symptoms complained of; and may not this constitutional peculiarity be overcome by persistence in wearing the plate, allowing a sufficient interval from time to time for at least a partial subsidence of the irritation, together with the use of a good mouth wash to assist in allaying the inflammation? Or shall we as some have suggested, condemn the use of rubber altogether? And what then? Shall we return to the gold work, which never made s good aa fit as rubber and at the same time gave less satisfaction to our patients and is far more expensive? Or shall we adopt generally the continuous gum work, which with all of its many virtues, has also some faults? Or shall we try aluminum, a more recent material, knocking for admittance into our labora-

tories, and possessing, it is claimed, qualities that are not found in any other substance, before offered to the profession?

ARTICLE V.

A Dislodged Tooth Replaced.

By H. H. Keech, D.D.S.

On the 11th, of October, 1864, Mrs. M.——of this city called on me with her son ten years of age, who while playing in the street fell on the curb-stone and knocked his left superior central incisor entirely out. I saw him about half an hour after the accident occurred. The first thing I did was to place the tooth in luke warm water. I then syringed the cavity with warm water, though it had bled very little, and there was scarcely any clotted blood in it. I then placed strong silk on the tooth, and forced it up into its socket, the cutting edge a little above the adjoining teeth, and requested his mother to hold it there while I made fast the silk. The pain caused by putting the tooth in was very severe, and made the perspiration come out in great drops on the little fellow's forehead. I directed the frequent use of Harris' gum wash and laudanum, kept the silk on two weeks, have seen the tooth frequently since, and it seems as perfect as any in his head, and abscess has never occurred, nor is it the least discolored on the labial surface, though you can by looking very closely see the slightest discoloration on the palatine surface. Should the tooth become dark, I will drill in, bleach, and fill to the end of the root.

The question may be asked by some, why was not this tooth drilled and filled before it was replaced as it could have been done very conveniently? I answer, by saying, that it could not have been done without destroying the periosteum which was attached to the tooth, thereby rendering the tooth, by the loss of this periosteum, entirely

a dead body. The periosteal attachment is now as firm as it ever was, and the tooth as perfect as any tooth can be when the nerve is dead. This case should have been recorded sooner, had it not been that I wished to wait until I could say it was an entire success.

SELECTED ARTICLES.

ARTICLE VI.

The Operation for the Cure of Double Hare Lip, by a New and Improved Method.

By A. Hammer, M.D.

During a quarter of a century I have had frequent occasion to operate for hare-lip, in all its various forms, single, double and complicated; and I freely confess that for twenty years I was never satisfied with the results obtained, though mine were, on the average, not worse than those of other Surgeons. I was frequently amused by looking at plates, where cases of hare-lip were pictured, before and after operation, showing beautiful and perfect results, whereas the comparison between the copy and the original would not have given a very flattering impression as to the ability or truthfulness of the artist.

The unsatisfactory results obtained in my own former practice, and present practice of other Surgeons, did not, and do not depend so much on the want of individual skill, as upon the intrinsic difficulties inherent to the nature of the lesion itself, and the deficiencies of the means employed to correct the deformity. The main points to which the frequent failures in double hare-lip with fissure of palate must be attributed, are: The rarity of union by first intention in the soft parts, or union of one portion with non-union or connection by ligamentous mass of the

remainder; the infrequency of firm union of the intermaxillary bones with lateral alveolar arches, and the resulting unevenness by lack of proper adaptation with regard to the convexity of the entire superior alveolar arch; the frequent mutilation of the nares, either by closing them up, or leaving them widely separated, the flat nose in the superlative.

Nearly all the difficulties with which the surgeon has to contend, can be overcome by following the method of operating which I have adopted.

The operative procedure consists of two steps: First, to bring the maldirected, intermaxillary bones into proper position and to make them fit exactly the opening left in the middle of the alveolar arch. This I accomplish by excising a triangular piece of the septum of the nose, of such an angle as to correspond to the angle made by the projecting inter-maxillary bones with the arch. After it has gently been moved downwards and backwards, the surgeon can judge how much or how little is to be cut off on one side or both, that the gap may be exactly closed. I give preference to this method of changing direction over all others.

Second: To separate, as may be required, the middle lobe from the intermaxillary bones, then to freshen its edges as well as the margins of the lateral parts of the lip, resorting if necessary to auxillary incisions in various directions according to the peculiarities of the shortening in the soft parts, accompanied by free and extensive incisions over the underlying bone so as to allow of great mobility of the lip. This being done, and the hemorrhage arrested, I apply a sustaining suture, which is in fact a quill-wire-suture, at a proper distance from the edges to be united. Two pieces of common, smooth lead pencil, from one and a half inch to one and three-fourths of an inch in length, and a strong needle armed with a double wire of a size larger than is ordinarily employed in the usual wire suture, are all that will be required.

The needle is passed through the entire thickness of the upper lip on a transverse line, striking the point of union between the septum and intermaxillary bones. The needle is made to transfix the integument from without inwards on one side, at a point half an inch posterior or outwards from the nostril, and through a corresponding point, but from within outwards, on the opposite side, and now the two pieces of pencil, one on either side of the face externally, are fastened by the double wire. Another similar suture is applied in the same manner and attached to the same pieces of pencil, about half an inch below the first, more near or remote according to the length of the intermaxillary bones, over which, that is to say in front of which, both wires must pass. By this means we accomplish a complete relaxation of the soft parts, all tension of the muscles being overcome the corresponding portions of the cut edges can now be readily approximated, to do which I employ the common wire suture—the wire being very small,—finding it less irritating than silk. Thus the operation is completed, no dressing being required except the occasional application of a little glycerine by means of a camils hair pencil, upon the united wounds. The wire suture should be removed at the end of three days, union by first intention having then taken place, while the sustaining suture may be allowed to remain to the sixth, seventh, eight or ninth day. The wires of the latter in course of time cut somewhat the soft parts, producing four small, transverse, slightly supurating wounds, which, however, heal without leaving any marked scar behind.

The advantages of the above plan of procedure are so obvious that I need scarcely refer to them, but in brief they are the following:

First, The intermaxillary bones are kept in close contact with the parts with which it is desirable they should unite, by the wires of the sustaining suture.

Second, All strain on the lips being removed, the soft

parts must unite by first intention, it cannot be otherwise provided all chemical or mechanical irritants are wiped from the wounds, which can so readily be done by a hair pencil.

Third, The degree of relaxation necessary to properly control and modify the future shape of the nares is entirely at the command of the surgeon.

Fourth, The absence of all dressing which would interfere with free respiration and thereby endanger life.

Fifth, The operation is completed at one session, and comparatively speaking, very brief space of time is required for complete and permanent union.

Sixth, The surgeon is relieved from an immense deal of trouble and constant attention, which is so necessary when other operative plans of treatment are adopted.

Seventh, The results are admirable, thereby not saying too much.

This method is not altogether new, as it has been resorted to, but only partially and for a different object, by Prof. Bruns, of Tubingen. Many years ago he applied a sort of quill suture, passing out one such beneath the nostrils through the septum narium to prevent too great narrowing of the nares, and in one instance he again applied a single quill suture near the free margin of the lip, in an unmangeable child, lest the lower suture when removed might be followed by rupture of the united wound. His fear in this last instance was certainly to some extent groundless, for in five cases out of six the rupture occurs, not near the free margin, but in the neighborhood of the nares.

The actions mainly of two muscles, viz: the levator labii superioris alæque nasi and the levator labii superioris proprius, has to be overcome. The zygomatici and the levator anguli oris are little to be feared, as any one can convince himself by applying his index fingers to the two sides of his lips, imitating my sustaining suture.

Though the meritorious and highly distinguished Prof.

Bruns did not apply the quill suture either in the same manner or for the same purpose, yet I thought it my duty to show that I was acquainted with the fact though irrelevant.

I earnestly desire the profession to give my modus operandi a trial, being assured it will meet with their approval. Of myself I can, without boasting, affirm that I am not now fearful of any form of complicated hare-lip, no matter how extreme the case may be, and that I now with pleasure and satisfaction perform an operation which formerly caused me more disappointment than any other one. —*Humboldt Medical Archives.*

ARTICLE VII.

Dissections of the Dead.

By Prof. Gibbons.

As soon as people adopt rational views on this subject—as soon as they realize the fact that if physicians and students have no opportunity of dissecting the dead, the living must suffer—that themselves, their wives and their children must be the victims, then they will not only exact from the practitioner of Medicine and Surgery an adequate knowledge of Anatomy founded on practical dissections, but they will provide the means for dissection.

A few states of the Union, rising above the standard of Chinese legislation, have legalized dissections, by providing that the bodies of persons dying in public institutions without relatives or friends to claim them, shall be at the disposal of physicians for dissection, under proper conditions and restrictions. We have a law in California to that effect. Such statutes are salutary, for the reason that they remove all incentives to the desecration of the grave. With this status in force, the friends and kindred of persons interred in our cemeteries may banish from

their minds all apprehension of disturbance of the bodies. Such apprehensions, however, are not well founded anywhere, under ordinary circumstances; for the public institutions of large cities always furnish ample material for anatomical examination. Besides, the risk of detection is too great, and the consequences too serious, to admit of the invasion of private cemeteries.

It is a great mistake to suppose that practicing physicians and surgeons are in the habit of dissecting, and that "subjects" are in demand among them. The common people ought to know that dissections are not performed at the houses or offices of physicians; that not one in fifty ever dissect a dead body after procuring his diploma; that it is only in connection with the education of students in medical schools that cadavers are needed; and that a very small number are sufficient for all purposes.

It is by no means creditable to the newspaper press, considered as an instrument for diffusing light and knowledge, that its influence is very generally directed so as to foster the foolish and barbarian prejudice against anatomical dissections. The story of a dead body in a box found on its supposed way to some doctor's garret, makes more noise than an earthquake. It is dressed up with every possible horror, and passed round through all the papers, as if to frighten people into the belief that a corpse is never safe in the grave, but that the doctors are prowling about all the cemeteries, like hyenas. There is no intention in this to impede scientific inquiry; only, such items are too valuable to be thrown away in making up a newspaper.

Not many years ago a famous trial took place in Boston, the result of which appeared to depend in a great degree on the fact that the slayer, for the purpose of concealment, had cut up the body of the victim and burned a portion of it. Such a deed was enough to overshadow all palliative doubts in regard to the circumstances of the homicide, and shut out the prisoner from all hope of mercy.

The mutilation of the corpse was held up to the jury with telling effect.

The same irrational prejudice which would prohibit all dissections of the dead body, also interferes with examination after death, for the purpose of ascertaining the seat and nature of the disease. Physicians should strive to educate the popular mind on this point by making examination whenever practicable. There is but little difficulty in the intelligent classes of society. Reflecting persons have sense enough to know that diseases run in families, more or less, and that the inspection of the lungs, or the heart, or the stomach of one member of a family, dying with disease of those important organs, may furnish the means of saving the life of some of the surviving members. The fault is often with the physician himself, who makes no proper effort, or, worse still, no effort at all, to prócure an examination, even in cases of great interest and importance. Sometimes the objections can be readily overcome by the clergyman of the family. Ministers of all denominations will almost invariably aid the physician in this respect.

If disease should invade the farm-yard and begin to carry off the cattle, how soon would the husbandman see that an examination be made of the dead cow or horse, for the benefit of the living! Even hogs and dogs would seldom be permitted to suffer for want of dissection of their dead comrades, to ascertain the cause of death. But when it comes to human beings, to the children and the family, a foolish prejudice interposes against their health and lives.

Persons are apt to entertain erroneous and often absurd notions as to the extent and manner of necropsic examinations. Care should be observed in asking consent to correct such errors. Sometimes it is not necessary to examine further than the abdomen or the chest. I have frequently overcome objections by urging the advantage to the preservation of the body, of removing the contents

of the bowels, as it is here that decomposition commences. Where it is desirable to keep the body several days before interment, the introduction of an antiseptic into the cavities, which is a sort of embalming, may be absolutely necessary.

Let me urge the propriety of making post mortem examinations in all cases where consent can be obtained. To young physicians is this especially important. It familiarizes them with the use of the scalpel, and perfects their knowledge of Anatomy, to some extent. It imparts knowledge, positive or negative, in regard to disease. It familiarizes the popular mind to a great necessity of science.

Many important problems in Physiology, which could never have been solved in any other way, have been determined by experiments on the living bodies of inferior animals. Attempts have been made on the score of humanity, in England and America, to prevent vivisections. In the City of New York a society for the prevention of cruelty to animals has arraigned Prof. Dalton before the public on this ground, and also appealed to the Legislature to prohibit the practice. A French journal notices the movement, and remarks that the New York society says nothing about the many thousand cattle which are slaughtered every year in Brazil to supply the New York market with raw-hide whips.

Physicians have frequently sought to abate the prejudice against dissections by requesting that their own bodies should be dissected or examined after death. Old Dr. Monsey, who died in 1788, at the age of 95, the favorite physician of Chesterfield and Robert Walpole, went so far as to direct that his body be dissected, and the remains of his carcass, to use his own language, "be buried in a hole, or crammed into a box with holes, and thrown into the Thames." His body was actually dissected, according to his instructions, and a lecture given upon it to the students of Guy's Hospital. I have known many instances of phy-

sicians requesting post mortem examinations, for the purpose of determining satisfactorily the nature of their disease. One case of a very different character fell under my observation. A physician dying of an obscure organic affection, the necropsic investigation of which would have been highly instructive and useful, said to me with great emphasis, when he felt his end to be nigh—"Under no circumstances am I willing that my body shall be opened after death." His wish was complid with, of course; but the diploma of such a man ought to be cancelled.

Civilization demands that the lifeless body be treated with decent respect; but veneration for it belongs to Paganism. To burn it and preserve the ashes was once the highest honor. In modern times it is buried in the earth. The Chinese in California are content to secure the bones and transport them to their native land. These things are governed by usage. Our custom is to clothe the body carefully, and deck it with flowers, to lay it in a well-wrought casket; and then it passes forever from view. Its putrefaction and decay we do not then behold. If we did, the probability is that we should begin to inquire whether it would not be better to burn it and preserve the ashes in a sacred urn. I hope the day is not far distant when it will be considered a slight and a dishonor to a dead body to bury it, like a dog, without scientific inspection. Inert and lifeless, a tenement deserted, a form without the soul which so lately inspired it, it is nevertheless a miracle of Divine workmanship. And there is more respect shown to its Creator, in reading from it a lesson of the wisdom and skill of the Architect, than in committing it, unimproved, to silence and to dust.—*Pacific Med. and Surg. Journal.*

ARTICLE VIII.

Trial of Tetrachloride of Carbon as an Anaesthetic. —Dangerous Effects.

By E. ANDREWS, M.D., Prof. of Principles and Practice of Surgery, Chicago Medical College.

IN a letter written a few months ago, to the EXAMINER, I called attention to the new anæsthetic called tetrachloride of carbon, introduced by Dr. PROTHEROE SMITH, of London. Dr. SMITH had used the article in about one hundred cases; and was disposed to believe it safer than chloroform and far more agreeable than ether. On my return to this country, I brought a sample of it with me, from the same establishment which supplies it to Dr. SMITH. I had a patient, upon whom it became necessary to perform the operation of resection of the hip-joint, and who had previously suffered so much nausea after the inhalation of ether, that he very much disliked to take it a second time. As one of the chief advantages of the tetrachloride of carbon is its freedom from nauseating effects, I deemed it best to use it in this case. Having no such inhaler as is used by Dr. SMITH, I employed a napkin, placed in a paper cone, and held a short distance from the face, as in giving chloroform. My friend Dr. SHERMAN, whose experience in giving anæsthetics amounts to some thousands of cases, took charge of the inhalation, and proceeded with rather more caution than he would with chloroform. Nothing remarkable occurred at first, but after the lapse of a few minutes, the assistant, whose duty it was to watch the pulse, observed that it increased suddenly in frequency, so that in a short time he was unable to count it. At the same time, the patient, who was not yet unconscious, complained of a violent pain, as of cramp, in the vicinity of the heart, and after a moment more, the pulse and respiration both suddenly ceased. The patient's

head was spasmodically drawn backward, and the countenance looked pale and deathly, and the pupils of the eyes dilated until the iris could scarcely be seen. Artificial respiration was at once commenced, and strong aqua ammoniæ was rubbed in the nostrils, under which treatment the patient revived again, although to all appearance almost dead. The asæsthesia was then completed by concentrated sulphuric ether, without further accident, and the carious bone excised in the usual manner. I do not think that there remained any prolonged unfavorable effect after the use of the tetrachloride, but the sudden advent of such urgent and dangerous symptoms made a strongly unfavorable impression on my mind, for the patient was much nearer death than I ever saw one go under ether. I certainly shall not venture on the use of the article again, unless very extensive experience by others demonstrates its safety.

It is proper to state that the patient was in a very exhausted and anæmic condition from the effects of disease, and was operated on as a last, desperate resort, having no other hope of life. He rallied from the operation pretty well, without showing any signs of injury from the tetrachloride, but died, subsequently, from exhaustion.—*Chicago Medical Examiner.*

ARTICLE IX.

Anaesthesia.—New Researches, Statistical and Chemical, Confirming the Duty to Use Ether instead of Chloroform.

By J. E. Petrequin, Ex-Surgeon-in-chief of the Hotel Dieu at Lyons, &c., &c.

(Translated and abridged from the French in *L'Union Medicale*, for the Boston Medical and Surgical Journal, by B. E. Cotting, M.D. of Roxbury.)

The choice between ether and chloroform for anæsthetical purposes must rest upon experience. In the history

of the two, ether has made notable progress—both in methods of administration and in purification. Complete anæsthesia can be produced by it with certainty and safety. It is not so with chloroform! No method of administration has removed its dangers, and no purification of the agent has secured safety. In fact, it has not made progress in either respect, and still continues year by year to furnish its numbers of victims.

Inasmuch, therefore, as ether is equally effective in all cases, and has not the dangers of chloroform, it is, in strict logic, an imperative duty to use ether instead of chloroform as an anæsthetic.

This conclusion, apparently incontrovertible, has been attacked by a distinguished surgeon, who declares that "pure chloroform, properly administered, never kills." Now this is a mere assertion, which cannot stand in the face of known facts. And, first, when among those who have met with mishaps we find names prominent in science, for example, MM. Robert, Manec, Marjolin, Richet, Fano, Jarjavay, &c., in Paris; MM. Barrier and Bonnet, to say nothing of other colleagues in Lyons; M. Languebeck, in Germany; MM. Lawrence, Gore, Lane, Bryant, &c., in England; who will dare to say that these men did not know how to administer chloroform? Are not these names in themselves a demonstration that there is no foundation for the pretended infallibility of the rules for its administration? Then, again, secondly, it will not do to assert that every accident presupposes *impurity,* without telling us in what the impurity consists. For, on the contrary, where accidents have happened, time and again, as in instances we cite,* the chloroform has been analyzed by most eminent chemists and found perfectly pure.

*In order to condense this paper, the citations in the original are omitted in the translation, and the conclusions only given. In one disastrous case, however, chemical analysis demonstrated the purity of the chloroform, which had been taken from a flask used successfully but a few moments before by a young girl.

Thus then, on the one hand, it has not been shown that the presence of extraneous matters in the chloroform has been the cause of death ; while, on the other, is has been proved that its perfect purification has not in any degree diminished such catastrophes.

Thus much established, nothing will better complete the parallel between ether and chloroform, or better determine the choice which ought to be made between them, than a comparative examination of the impurities they are each likely to contain, and their liability to produce disaster.

To begin with ether : it is well known that ether is the product of the reaction of sulphuric acid upon alcohol. Its principal impurities arise in the process itself. Thus ether may contain water ; hydrated alcohol, heavy oil of wine, empyreumatic oils, sulphurous acid, and at times a trace of sulphuric acid, &c. The oil of wine may decompose, and give to ether an acid reaction, which has been attributed to sulphurous acid. Air in the flasks containing ether may also, in time, cause further decompositions, as into water and acetic acid. The oil of wine, and, above all, empyreumatic oils and sulphurous acid, take from ether its penetrating and agreeable odor, and its punget and aromatic taste. Shaken with water, ether makes a turbid mixture if it contains oil of wine or pyrogenous oils. The presence of acetic, sulphurous, and traces of sulphuric acids may be detected by their reddening litmus paper. Sulphurous acid is especially recognizable by its action on the salts of barytes.

To purify ether, let it be washed in water which takes up, or, better, in a weak solution of caustic potash, which saturates all the acids ; then distil it over lime from a water-bath, it being so volatile that it passes over first, at 96.5° Fahr., leaving behind the heavy oil of wine, water, hydrated alcohol, and the acids converted into salts by the potash. If below proper standard (63° to 65°, aréomètre de Baumé,) it may be submitted to a second distillation.

Thus, as any one may see, there is nothing very deleterious here. These impurities may render etherization laborious, disagreeable, complicated with nausea and nervous excitation, but are not in themselves essentially dangerous. Besides, all these impurities may be removed, by washing, and subsequent distillations carried to the required rectification.

To continue the examination comparatively; it is well known that chloroform is the result of the reaction of chlorinated lime on alcohol. Its principal impurities arise in the process itself, and from spontaneous decomposition. It may contain alcohol, chlorous water, hypochlorous and chlorohydric acids, ether, hydrocarbonated oils, aldehyd, fixed substances, &c.

To obtain chloroform pure, MM. Pelouse and Frémy (*Traite de Chimie*, t. v., 1865) state that it is sufficient to wash it in water, and distil with a water-bath. MM. Barreswill and A. Girard (*Dict. de Chimie Industr.*, t. ii., 1862) first wash the chloroform with water containing carbonate of soda, to remove the chlorine, aldehyd, alcohol, and to saturate acids. On being allowed to rest, the chloroform separates and sinks to the bottom of the liquid. They then decant, wash anew until it reaches 48° (aréomètre,) and then carbonize the oils and organic impurities with sulphuric acid, which is also removed by a final washing; after which they distil the chloroform from the water-bath over a solution of carbonate of soda, to saturate any acids that may have previously escaped removal.

The importance of the question at issue determined M. Pétrequin to institute with M. Emile Chevalier, a pharmaceutical chemist at Lyons, a series of experiments, of which he gives the detailed results in the *Union*.* He concludes:—

Our experiments show that chloroform of commerce does not contain alcohol, ether, chlorine, hydrochloric or

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* Omitted in the translation for sake of brevity; so, also, statistics of casualities, more than two hundred, afterwards enumerated by the author.

hypochlorous acid. It has a little formic and acetic acids, and perhaps a slight trace of aldehyd. As to the compounds of methule, the great dangers of which have been bruited so loudly, we repeat here that as M. Letheby, who called attention to them, himself avows that there are no reagents in chemistry capable of detecting such compounds, it is prudent to wait before final decision. Besides, a double washing is sufficient to remove them, if present.

In conclusion, it is evident that the danger lies in chloroform itself. If it kills, it is not because it is impure; *it is because it is in its nature a poison*—a fact shown unquestionably in experiments upon animals, as well as in human pathology.

In the actual state of science, then, the only way to avoid the censure of society, to secure the protection of justice, and, above all, to remain at peace with one's own conscience, is to discard forever a dangerous agent, which, every time that it is used, puts at hazard the fearful question of life or death.*

MONTHLY SUMMARY.

Food for Babies.—From an interesting article on "Food for Babies," published in the London *Medical Times and Gazette*, we make the following extracts.—*Boston Med. and Surg. Journal.*

Of milk, we have that of the ass, goat, and cow. Asses' milk is by general consent the best substitute for the woman's for most delicate children; and, dear as it is, it is well worth the money. The goat's is a rich milk, and with a strong curd, and

* Appropriate to our subject are the memorable words of M. Amedee Latour:—"In face of disasters constantly accumulating, in presence of desolating fatalities increasing in number day by day, is it allowable to remain inflexible in positions, heretofore reasonable perhaps, *but which events too sad and numerous now requires us to modify?* What is a position, be it ever so legitimate, compared with the life of the most insignificant of men? And is it not the absolute and supreme respect for human life which gives grandeur and dignity to our art?"

only adapted for robust children. The milk of the cow is, of course, the staple. And whilst for general purposes it is quite right that milk should be brought from any distant part of the country, it must be confessed that a few cows should be kept in town in hot weather, that their milk may reach the baby part of the population fresh, unshaken, and just as yielded by the animal. But cow's milk is too rich in curd for the human baby, whose muscular movements are almost confined to breathing, crying, and the heart's action, So it must be thinned, and the simplest way is the common one of adding an equal part of water (the water being gradually diminished as the child grows older) and a small quantity of white sugar. It is a refinement to use the sugar of milk, instead of common cane sugar, but whether there is anything gained we never could satisfy ourselves.

The test of any kind of baby's food is found in the fact that the child thrives—that it is satisfied after its meals, not subject to fits of pain in the stomach and flatulence, nor yet to fits of colic in the bowels—and that the residum, which is generally produced upon a napkin for inspection, does not show undigested food. All these things are self-evident. A child ought regularly to grow, to be plump, and to gain in weight every week, and if it do not, something is wrong. Secondly, the child ought to be satisfied and go to sleep after its food ; but here the junior practitioner ought to be aware of one physiological fact—when a child is in pain in the abdominal organs, it often displays insatiable hunger, has a tendency to suck greedily, and this though the stomach and bowels may loaded with undigested food. Ignorant nurses kill many a child by inattention to this point. The child cries after food ; therefore they say the food is not good enough, "the milk does not satisfy," &c., and forthwith they give the child some half-solid pap, and dose the mother with over-rich food and alcohol. A purgative dose of oil is the best remedy when a baby is unreasonably hungry after food ; castor oil is generally used, but any oil or soft fat will answer the purpose. The old custom of giving a bit of the fat of a pig is founded on reason and experience. Lastly, the practical fact remains that no undigested food ought to be found in a baby's napkin. Any mother may be taught that lumps of curd and masses of undigested starch can give the child no nourishment,

but decompose in the bowels, and cause first pain, next diarrhœa. A healthy baby's napkin should not be offensive—of course, it has a faint peculiar odor, but certainly it does not stink, and it do, either improper food has been given, or proper food has not been digested.

In other cases, in order to diminish the proportion of curd, it is useful to give *cream* diluted with new milk and water; and, to prevent the curd of cows' milk from coalescing into hard lumps in the stomach and passing undigested, the milk may not only be diluted with water, but with effervescing soda-water (this is called artificial asses' milk) or potass-water or lime-water. Sometimes a very little of the solution of magnesia is added.

But this purpose (*i. e.*, the making the curd softer and more digestible) is generally effected by mixing it with cereal food or the starches. Theoretically speaking, we do not want the nitrogenous elements of the cereals, because the cow's milk contains enough of them. Hence, arrowroot or sago may suffice, if it be understood that the child is to live upon the milk, and that these starchy elements are superadded to modify the milk and not to be substitutes for it. Still, general experience is in favor of some cereal. Barley-water made from pearl barley, and mixed with an equal part of milk, is an admirable food for most children. Robinson's patent barley deserves praise. Oatmeal gruel and milk agrees well with the robust. Brown and Polson's preparation of maize and the maizena, seem favorite preparations. On the whole, however, wheat tends to displace the other cereals. The flour of wheat is often baked or broiled, and when so cooked is boiled afresh with water and milk. Or it is made into biscuits, of which Robb's, Lemann's, the Norwich knobs, "tops and bottoms," and rusks, are popular samples; or into a farnaceous food —that is, a powder composed of wheat flour or biscuit, with or without admixture of other cereals, and already acted on by heat, so as to require little or no cooking (Hard's, Neave's, &c., &c.)

This is the place to notice "Liebig's soup," a compound of milk, wheaten flour, and malt, with a small quantity of bicarbonate of potass The object of the malt is to convert the starch of the wheat into sugar, and so to save the stomach the trouble of that process: whilst the cow's milk is enriched with the phos-

phates of the wheat and the added alkali. The thanks of society at large are due to Liebig, not only for the care and patience with which he has worked this idea out, and the liberality with which he published it, but likewise for the impetus which it has given to the study of the whole subject of infant food in connection with mortality.

The original recipe prescribes ½ ounce of wheaten flour, ½ ounce of ground malt, and 7½ grains of bicarbonate of potash, to be well mixed with 1 ounce of water; then 5 ounces of cows' milk are added, the whole is heated gently till it thickens; then it is removed from the fire, stirred till the starch is converted into sugar, as indicated by the liquid becoming thin, again boiled and stirred for some minutes, and lastly strained. For use, this requires to be much diluted for young babies, less for older ones. * * * * * * * * * *

As for results. We believe that of any six infants one would refuse to swallow it; one would take it without benefit: but but that the remaining two-thirds would take it greedily and thrive on it. We have known it put a stop to so many of the miseries arising from undigested or indigestible food, that it has, we think, already earned for itself a permanent place. What form of it will ultimately be the favorite is another question.

The objections to Liebig's food in its common form are, first, the time, trouble and nicety—it cannot be prepared in less than twenty minutes, and not every nursemaid or mother has the intelligence sufficient. Secondly, there is the considerable amount of indigestible husk, often very difficult to separate by straining, and consisting of spicula that look very formidable to any tender mucous membrane, Thirdly, as a theoretical objection, we mention its too saccharine nature and the absence of fat.

The first objection has been met by Savory and Moore, who have put together and prepared the ingredients in such a way that they only need the addition of water and milk, and no straining nor boiling. Mr. Mellin's preparation, if it can be got, of course avoids all trouble of cooking; and we may say that the malt he uses is most scrupuously cleansed from husk. There is also to be procured at Mr. Van Abbott's a preparation called "Liebig's Food for Infants concentrated," the invention of Mr. Ed. Lœflund, chemist, of Stuttgart; it is a thick syrup, contain-

ing a concentrated solution of the wheat and malt elements. It has, when mixed with milk in due proportion, a sweet, somewhat empyreumatic, bitter taste, and this is the general character of the food, however prepared; but there is a distinct acid tracely reaction in Mr. Lœflund's syrup. Mr. Mellin has made an extract in the form of granular powder, soluble in cold water, very palatable, free from acidity, and much more portable than Lœflund's syrup. Lastly, we must notice the very ingenious malt biscuits made by Spiking, of Dover Street; these contain the malt and wheaten flour in the form of a biscuit; of course they are portable, and keep any time, and require no more cooking than Robb's or any other nursery biscuit. * * *

We have now, we trust, set forth a pretty general view of infant's food, and shall add but three or four practical hints:—1. The advantage of adding cream from time to time, especially if the baby is constipated. Want of fat is the cardinal defect in Liebig's soup. 2. The expediency of adding a small quantity of some aromatic water to all infants' food, such as dill, anise, &c. There is a very popular food in some countries, consisting of equal parts of barley-water and milk, with one teaspoonful of good brandy to the pint. Bad for the babies' livers, some would say; but no harm is found in practice. 3. The expediency of giving delicate children small quantities of pure gravy or beef-tea, sweetened or a few grains of raw meat ground to a pulp. If these agree, a child is almost safe. 4. No one kind of food can agree with all children. It has provoked us to see children dying on a diet which did not suit them, without an effort to shift and combine various elements till the right thing could be found. 5. The importance of teaching the poor that food for babies should be *thin*, and that a thin food may be more nutritious than a thick one.

Prevention of Sickness from Chloroform.—A writer in the *British Medical Journal*, says:

"Vomiting is so frequent and so troublesome a concomitant of the administration of chloroform both during and after the inhalation of the anæsthetic, that I am pleased to lay before your readers the general result of a very simple, and as I believe, a very effective mode of prevention. I have already, in some

eighteen or twenty eye operations, adopted the plan of giving the patient a drink of a few drops of chloroform in water before commencing the inhalation, and so far the result has been most satisfactory; not more than one, or at most two, cases of slight nausea having occurred where the chloroform drink had been previously administered. The remedy has, of course, to be more extensively tested before it can be relied upon; but I should be glad if some of your correspondents would record the result of their experience in its use."

Heart's action after Death.—M. Marcelin Duval, director of the Brest Naval Medical School, has published a paper on the Physiology of the Circulatory Functions, in which he records the results of experiments made upon guillotined criminals. From a translation of an extract from this report, we gather the following interesting facts.

Five or six minutes after decapitation the carotids continued to pulsate, thrusting themselves beyond the level of the section of the neck, and then retracting, and emitting at each pulse a little frothy blood. Seven minutes after death, the chest was rapidly opened, and the heart was beating at the rate of forty-eight to the minute. The left auricle rested on the aorta, embracing it. After a short rest, this appendix rises suddenly, leaving the aorta, swelling, elongating and throwing the fringes on its edge into denticulated folds, and then falling back again upon the great artery. In one subject the heart continued to beat for an hour and a quarter, its pulsations being uninterrupted by the removal of the stomach, the intestines, the diaphragm and the lungs. The ventricles contracted simultaneously, shortening all their diameters and gathering their surfaces into folds and wrinkles, the contractions commencing at the base and running down to the apex of the organ.

Splanchnoscopy.—All the dark recesses of the human body have been pried into. Specula for the uterus, for the anus, for the ear are antiquated affairs. We peer into the larynx now, and the endoscope reveals to us the inside of the blad-

der. We are literally being turned inside out by modern contrivances. The latest invention is that of an ingenious Frenchman who having, in his childhood, seen his venerable grandam peer through an egg against the light to test its freshness, has conceived the bright idea of treating men and women after the same fashion. He makes his luckless patients swallow glass tubes which contain platinum-wires arranged to produce the electric light. He then connects them with a powerful galvanic battery, and a brilliant illumination of the stomach is the result. He expects in this way to render the abdominal parietes sufficiently translucent to detect tumours, indurations and ulcerations. If we could only print the significant national shrug, we should say in his own language, "peut etre."

A New Micrometer.—Dr. Van Gieson publishes in the *Medical and Surgical Reporter*, a plan of a new micrometer, which promises to be cheap, accurate and effective. It is simply an application of micro-photography. An object is prepared consisting of crossed lines at equal distances and then photographed on glass. A very simple calculation gives the absolute size of the minute squares. To preserve these lines permanently, it is only necessary to heat the glass just to the point of fusion, when they become incorporated with the substance of the glass. Of course if too great heat be used they will be warped out of shape, if too little, they will not be fused into the glass. The present high price of micrometer slides produced by machine-ruling, will, we suppose, render the profession eager to try the very simple and inexpensive process thus suggested. The value of microscopic observations, as all know, is greatly increased by the measurements which the micrometer enables the observer to make.

Testing Glycerine.—The effect of glycerine on tender and broken skin should be mild, but physicians often hear complaints of its burning and inflammatory action, even when it has been largely diluted with water. The effect of such glycerine is now known to be due to the presence of a certain amount of oxalates and formates, also traces of ammonia. Litmus paper will remain unchanged in such impure glycerine; but when the lat-

ter is mixed, in a test-tube, with its equal bulk of sulphuric acid, a strong effervescence will take place. It has also been ascertained, that such glycerine was not obtained by the process of distillation, but was only partially purified by chemical action.—*Med. and Surg. Reporter*

BIBLIOGRAPHICAL NOTICES.

Chemical Essays in Reference to Dental Surgery.—By Prof. George Watt, M.D., D.D.S., of the Ohio Dental College. Published by S. S. White. We are glad to have these interesting *Register Papers* in the form of a handsome little volume of two hundred and sixty pages, and recommend the work to all our readers. A perusal of it will convince every one that it is a valuable addition to the literature of our profession, and we can only regret that Prof. Watt has not seen fit to treat at greater length, some of the subjects upon which these interesting essays have been written.

The neat appearance of the work does credit to the publisher.

The Teeth: Their Health, Disease and Treatment.—By J. P. H. Brown, Dentist, Augusta, Georgia. The author announces in the preface that this little work has been written to instruct the people, and that he has divested his description, as far as possible of technical language. That he has succeeded in his efforts to present the subjects treated of in an intelligible manner, is apparent on a perusal of the work, which, though small, contains much useful information.

Transactions of the American Dental Association—This is a full account of the proceedings of this Association at the meeting held in Cincinnati, July 30th to August 3d inclusive, 1867, in a volume of one hundred and thirty-three pages, which contains much useful information.

EDITORIAL DEPARTMENT.

The American Academy of Dental Science.—A number of prominent dental practitioners in Boston have established an institution, to which they have given the above title.

Their object is set forth in the following preamble of the Constitution and By-Laws, a copy of which we have received from the Corresponding Secretary.

"In view of the great importance of the art of Dentistry to the human race, and for the purpose of promoting the theoretical and practical knowledge of the same, as well as for elevating the standard of the science, and the requirements of practitioners of the profession, we, the nndersigned, do hereby agree to establish an institution for cultivating and advancing a knowledge of Dentistry among its members." The officers for the coming year are; President, E. T. Wilson, M.D.; Vice President, D. M. Parker, M.D.; Recording and Corresponding Secretary, E. N. Harris, D.D.S.; Treasurer, J. L. Williams, M.D; Librarian, John Clough, M.D.; Board of Censors, E. G. Tucker, M.D., D. M. Parker, M.D., J. L. Williams, M.D. From the high professional character of the officers of this new institution, we are confident that it will exert great influence in accomplishing of the object for which it has been instituted.

A Move in the Right Direction.—We have before us the announcement of a course of special medical instruction, by Dr. H. R. Storer and other physicians of Boston. We find the subjects treated of to consist of Public Hygeine and Medical Jurisprudence, Diseases of Women, Operative Ophthalmology, Diseases of the Skin, Veterinary Surgery and Medicine, Diseases of the Teeth, Surgical Deformities, Diseases of the Throat, Diseases of Infants and Children, Toxicology, Venereal Diseases and Practical Pharmacy. This is a goodly array of specialities. While we might desire to see some omitted, and others inserted in the catalogue, it is nevertheless evident that the student can derive great benefit from the course, if it be faithfully followed. Of course, no one student is likely to take all the tickets. The very minuteness of the detail would prevent that,

So rapid has been the advance of science of late years, that no one can hope to cultivate with success the whole wide field which lies before him. He must be content with the general results of even one study, and confine himself to some special department of it, if he would be thorough, and especially if he would rise to eminence. In nothing is this concentration more necessary than in medicine and surgery. So close and minute has been the study of the numerous acute observers whose attention has been drawn to the healing art, that almost every organ has a literature of its own, which requires no little time and attention to master. This conviction is forcing itself on both the profession and the public. The consequence is that specialists are becoming daily more and more numerous, as well as more necessary.

We therefore gladly chronicle the movement already inaugurated in Boston, and trust it may be followed by others all over the country. Why cannot such a school be organized in Baltimore? We have between

three and four hundred medical and dental students here, a respectable number of whom would doubtless be glad to pursue special studies.

Vulcanized Rubber for Capping Exposed Nerves.—Dr. J. R. Walker of New Orleans, in an article published in the November No. of the *Dental Register*, recommends vulcanized rubber caps over exposed nerves, and describes his method of applying them in the following case:

"Having about two years since an unusually difficult case, in which the patient (a lady) was very desirous of having a pulp saved, and being satisfied that nothing which had been been tried, would prove equal to the occasion, it occurred to me that *vulcanized rubber*, ought to answer the conditions, better than anything that had been used.

The tooth was the right superior central incisor, cavity very large, in the labial surface, exposure large, but pulp healthy, and the patient ditto, temperament nervous sanguine. I took a piece of rubber plate, with one side finely polished, and after filing it to the proper thickness, cut out the cap in form to suit the cavity, then, with a fine file, dressed the edges thin, leaving it thick enough in the central portions, to sustain the filling. Having the cavity well prepared, I placed the cap over the exposed pulp, and filled with gold.

Notwithstanding the size of the cavity, and its peculiarly exposed position to all thermal changes, the rubber being a non-conductor, and the thin and pliant edges giving it a thorough adaptation, proved so good a protection, that the patient has never felt any inconvenience, even in drinking ice water. Thus encouraged. I have tried it in, perhaps, fifty cases since, being careful that the pulp shall be always healthy, and although I have used it in each case, with the understanding that it was an experiment, the patient promising to inform me of any want of success, I have not heard of a single failure.

As my experience in this method of saving pulps has been so exceedingly satisfactory, I offer the idea to the profession, hoping that by so doing I may enable others to *save more teeth alive*, and induce them to abandon the too common practice of murdering every dental pulp that has a slight exposure."

A Mistake.—We quote the following from the Phila. Dental Quarterly: —"R. D. C., of Stockton, California.—Your tickets for a course of instruction at our Philadelphia Dental Schools, will cost you about $135. You can get board for from $5 to $8 per week. In Baltimore it is more costly. We decline to direct you to any particular college."

The tickets for a course of instruction in the Baltimore Dental College will cost $125, including anatomical dissections. Board can be had in Baltimore at $4.50 to $7 per week.

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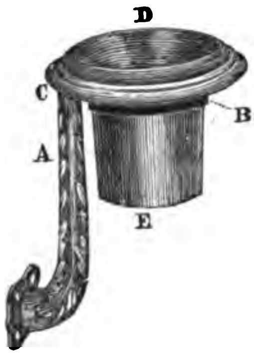

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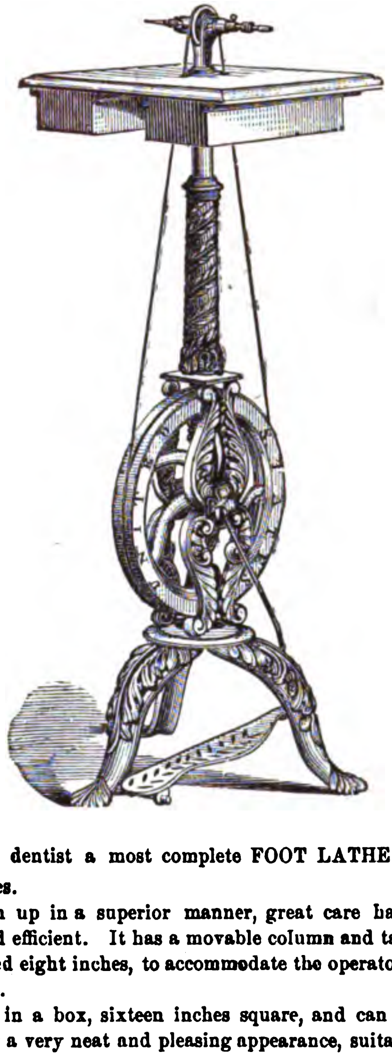

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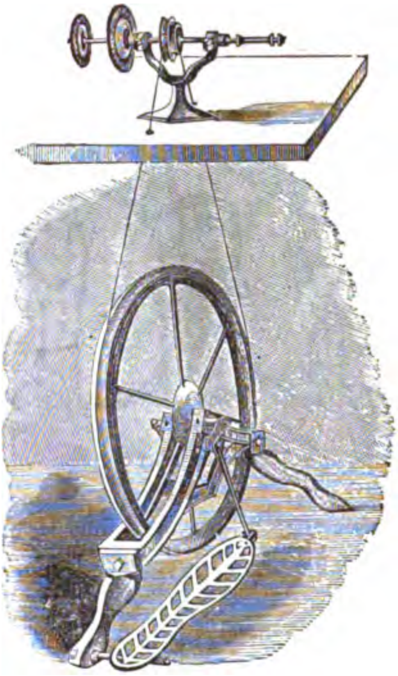

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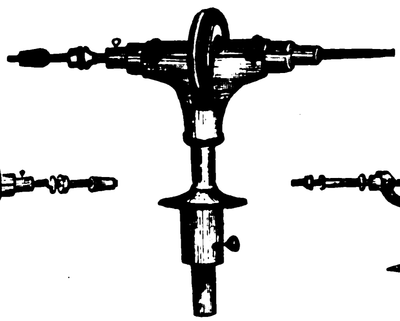

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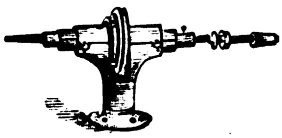
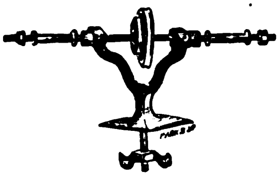


C.



A.—SOCKET HEAD.—The socket screws to the table, has a set screw in the lower part, the head slides four inches to tighten the strap or vary the height from the table..PRICE $10.00

B.—U. S. LATHE HEAD, with holes in the base to screw to any table ....PRICE $8.00

C —DIAMOND LATHE HEAD.—The head, pulley, and spools, which retain the wheels and brushes, are of brass. The spindle is of the best unannealed hammered steel, and of the size to suit the holes in the wheels............PRICE, $9.00

SNOWDEN & COWMAN.

FLASK PRESS.

This Press is intended to close the flask together after packing with rubber, thereby saving the screws of the flask—it is of great advantage, saving screws and flasks. PRICE $2 00.

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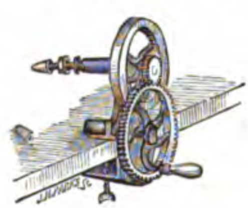
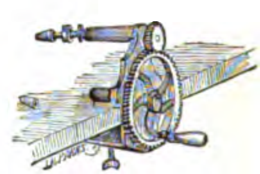
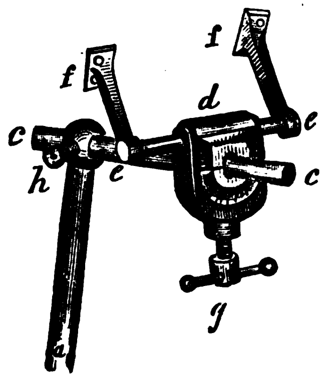




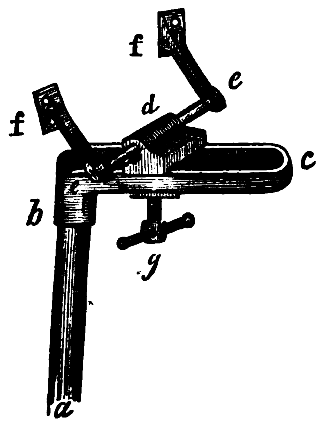
UNIVERSAL MOVEMENT HEAD REST.

PATENTED SEPT. 24th, 1867.



Rod a slides in the back of the chair, and has a revolving movement.
Rod c c slides through the top of the rod a, and is fastened by screw h.
Frame d slides and revolves on rod c c, and Rod e e slides through the frame d, to give the side movement, both is fastened by screw g.
The cushing is attached at f f.
PRICE—with attachment for any Chair.......... .... $15 00

IMPROVED HEAD REST.



Rod a slides in the back of the chair and has a revolving motion.
Frame d slides on c, and Rod e e slides through frame d, both are made fast by screw g.
The cushing is attached at f f.
PRICE—with attachment for any Chair.................... $12 00

SNOWDEN & COWMAN,
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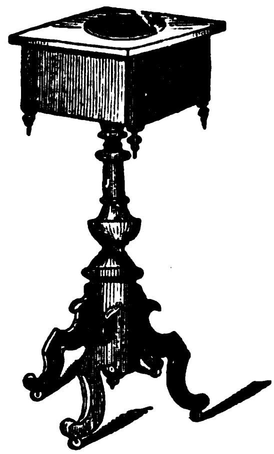
SPITTOONS.



MAHOGANY OR WALNUT.

Square marble top, drops pending from each corner, turned pillar, feet on rollers.

PRICE, $15.00.

FOOTSTOOLS.

With cylinder to raise and lower, covered with Brussels carpet, price........	$15 00
Covered with ingrain carpet........	13 50
A very neat footstool, with steps covered with Brussels carpet, as per cut...	10 00

DENTAL CHAIRS.

We are manufacturing a handsome DENTAL CHAIR, that has no superior in the market for the price. It is made of walnut, upholstered in fine plush, with plated nails, silver plated head rest, and has all the movements. This chair has been very much admired and gives entire satisfaction.

Price........	$90 00
" In rept........	80 00
Iron head rest bronzed........	10 00 less.

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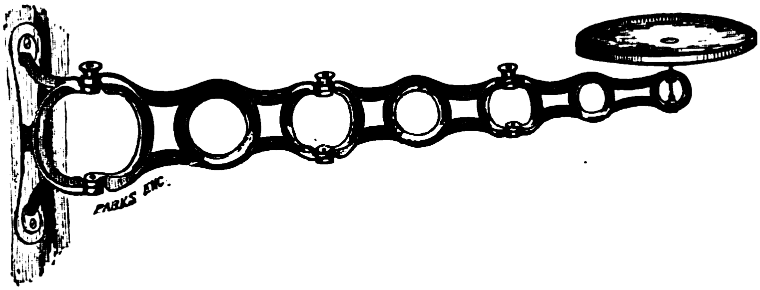
EXTENSION BRACKET.



This Bracket is made of iron painted in imitation of walnut or bronzed. When straight out is very stiff, has a thumb screw at each joint to keep it in any position it may be placed, and folds up close. It only weighs 5 pounds.

Price without Table.. $6 00
Price with Table... 8 00

SNOWDEN & COWMAN.

DR. WELCH'S NERVE PASTE.

This preparation is very certain in its action on the nerve, destroying it in less than twenty-four hours. It has the advantage of not causing pain or producing inflammation, with very rare exceptions. Also, it may be used with safety in cases of toothache that proceeds from exposed nerve, and seldom fails to give relief in from five to twenty minutes.

DIRECTIONS.—Place a portion of the size of a pin's head in IMMEDIATE CONTACT with the exposed nerves, covering it carefully with wax, allowing it to remain twenty-four hours. A very minute portion placed in a cavity, in preparation for filling, will destroy its sensibility in four to six hours. The bottle contains sufficient for two hundred applications.

N. B.—If the paste should become dry, moisten it with creosote or warm it until it is quite soft.

☞ If after twenty-five applications, it does not give satisfaction, return the Nerve Paste and we will return the price. PRICE $1 00 per vial.

SNOWDEN & COWMAN.

DR. WELCH'S AMALGAM.

This is a new recipe, and we claim for it a superiority over any other now in use. It has a large proportion of the noble metals, giving this amalgam the requirements of a good filling. PRICE $3 50 per oz.

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For Advertisements and Business Cards.

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37 Cents.

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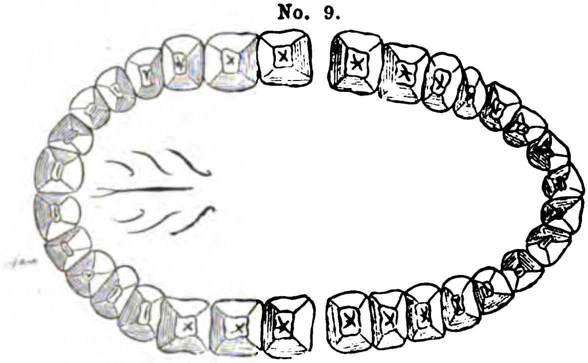

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TOOTH-POWDER BOXES.

Paper, fancy colors and Gilt lined with Tin Foil	per doz	60
Wood, No. 1, varnished	"	45
Wood, No. 2, varnished	"	50
" No. 3, "	"	60
" No. 4, "	"	70
Glass with metalic Tops	"	1 25
" " Glass Lids	"	2 00
" " " " Small	"	1 25

AUSTEN'S MOULDING RINGS

Consists of four rings in a nest, requiring but little sand. Price 75 cts. per nest.

CORUNDUM WHEELS, Etc.

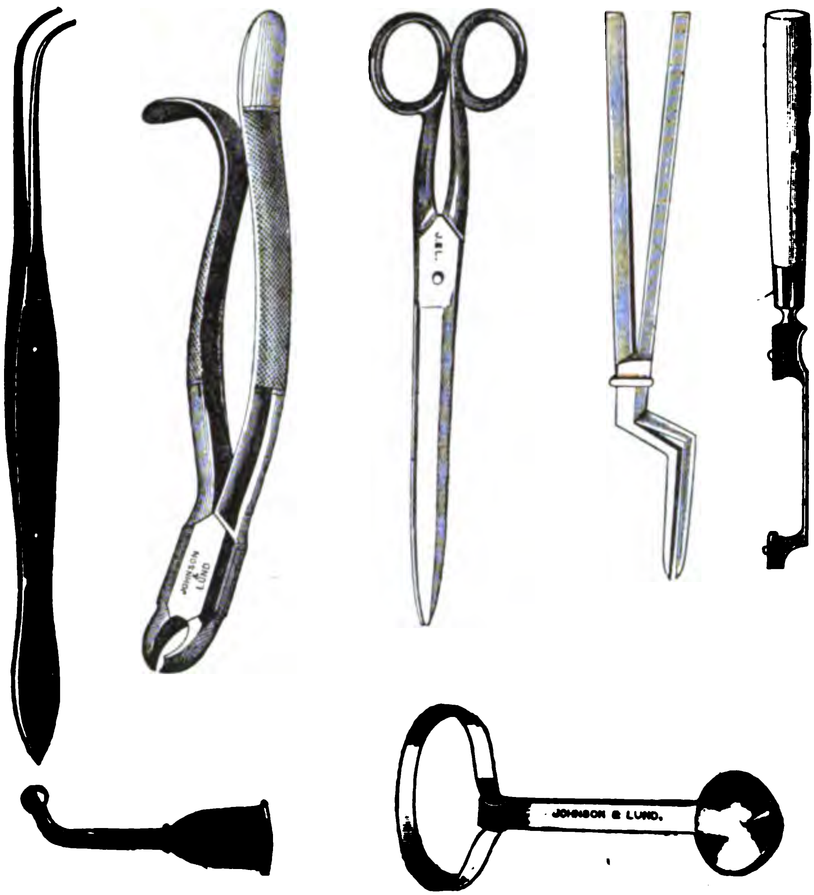
No. 00	each	7
No. 0	"	9
No. 1, ⅛ inch thick and under	"	12
No. 2, ⅛ " " " "	"	16
No. 3, ⅛ " " " "	"	20
No. 4, ⅛ " " " "	"	25
No. 5, ⅛ " " " "	"	30
No. 6, ⅛ " " " "	"	40
No. 7, ⅛ " " " "	"	60
No. 8, ⅛ " " " "	"	1 00
No. 9, ⅛ " " " "	"	2 00
No. 10, ⅛ " " " "	"	3 00
Corundum Cones	"	20
" Cups, small	"	30
" " larger	"	40
" Files, Round, Taper and Flat oval	"	30
" Slabs	"	30 to 60
" Tape, in two yard lengths	"	10

FELT WHEELS.

No. 1, 1¼ inch diameter ⅜ inch thick	each	15
No. 2, 1¾ " " ⅜ "	"	20
No. 3, 2 " " ⅜ "	"	30
No. 4, 1¾ " " ¾ "	"	35
No. 5, 2 " " ½ "	"	40
No. 6, 2¼ " " ¾ "	"	50
No. 7, 2¼ " " ⅜ "	"	40

BRUSH WHEELS.

Cotton or Buff Wheels	each	15 to 60
Brush Wheels, *large variety*	"	15 to 90



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OPERATING TOOLS,

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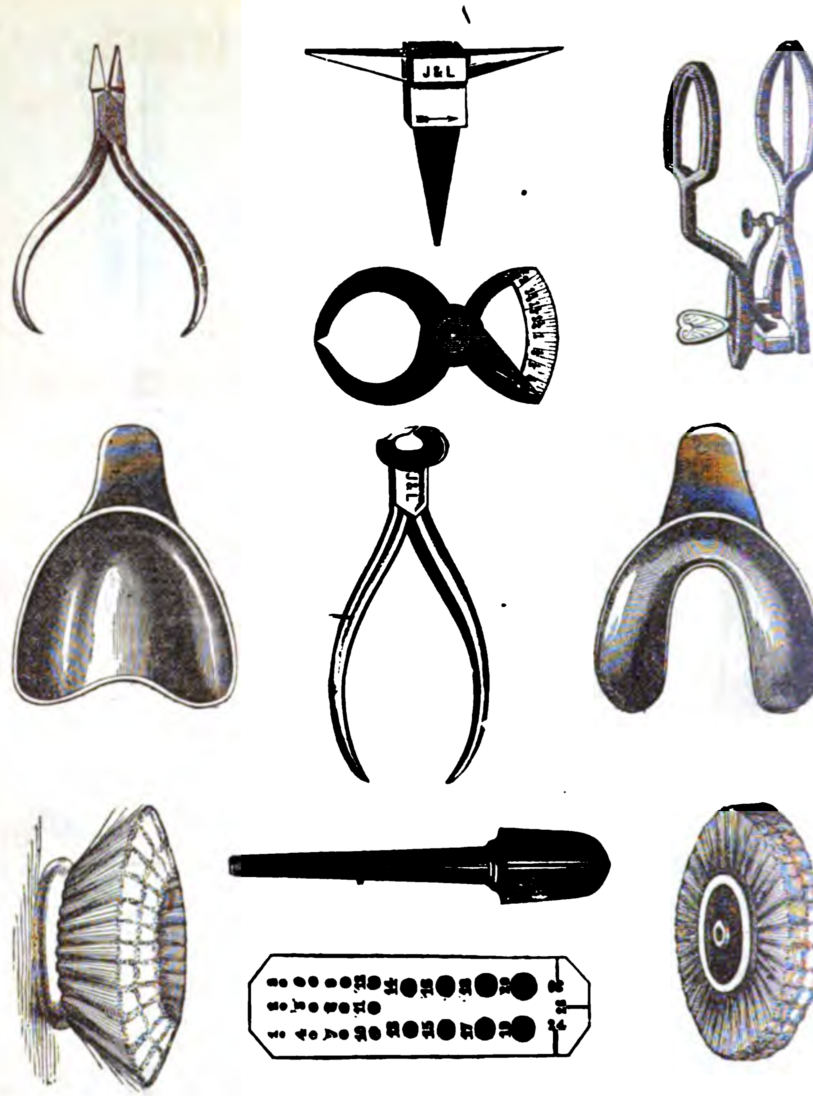
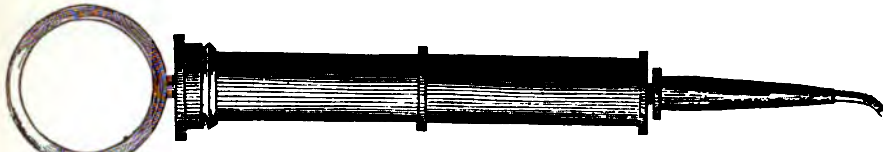

J&L
J&L

DENTAL SYRINGES.



Gold, 18 Carats fine, two pipes	....	$30 0
Silver, " "	....	7 5
" plated " "	....	4 0
Glass, Silver mounted " "	....	4 5
Vulcanized Rubber " "	....	1 0
" " silver pipe	....	1 5

SPRAY APPARATUS for producing Local Anæsthesia.

Manufactured by CODMAN & SHURTLEFF.

Apparatus with one bifurcated double jet straight tube	$6 00
Apparatus with two curved double jet tubes instead of straight	9 00
Apparatus with one single jet tube, for surgeons use	5 00
Price of double jet tubes, each	3 00
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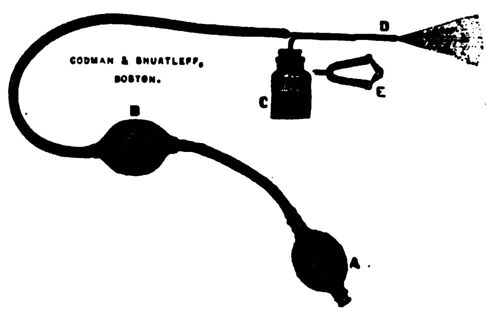
Rhigolene, best quality, per 12 oz. bottles	1 00
Concentrated Sulphuric Ether, 1 lb bottles	2 00

SNOWDEN & COWMAN.

Apparatus for Local Anæsthesia or "Spray Instruments."



Testimony is abundant to show that the apparatus as made by ourselves for use upon the principle of Dr. Richardson—but not after his plan—though simpler and less expensive than other kinds is *the best hitherto constructed*, for the use of Dentists, Physicians and Surgeons.

Every instrument is made in the most careful manner, and furnished with patented tubes and regulator.

Tubes will be furnished separately if desired and will fit most of the Bulbs in use, without alteration.

Descriptive circulars with price list may be had on application, and apparatus may be procured of ourselves or at most of the Dental depots.

CODMAN & SHURTLEFF,

Makers & Dealers in Dental Instruments & Materials,

No. 13 TREMONT STREET, BOSTON.

IMPROVED BELLOWS HEAD REST.

Fig. 1.

Fig, 2.

FIGURE 1.—Is the Head rest ready for use. FIGURE 2.—A diagram showing the movements.

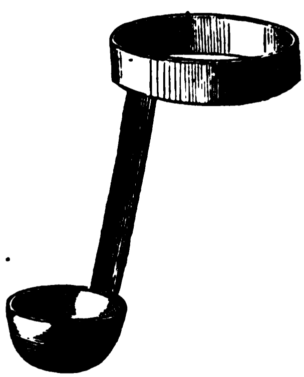
The plate A supports the Head rest. The plate B is screwed to the underside of the bellows, and has a slaught or groove formed like the letter H, by the means of this slaught we have a backward and forward movement of 8 inches, a side movement of 6 inches, and a circular movement around the thumb-screw C which fastens the Head rest in position.

The dotted lines show the movements.

SNOWDEN & COWMAN,

82 West Fayette Street, Baltimore.

BUR THIMBLES.



STEEL—As per cut... 50

GERMAN SILVER—Thimble hinged to the ring.................. 50

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The plan of organization of this College provides for a course of instruction, didactic and demonstrative, by the above-named Faculty and their Assistants, in Practical Dentistry and collateral sciences; and also a Dental Infirmary, where Clinical Instruction will be given by the Board of Clinical Lecturers, which comprises a large number of the most skillful gentlemen in the profession. This Board will give daily Clinics during the entire session. The advantages to the student of such a combination in acquiring a thorough and practical knowledge of the science and art, it is believed, cannot be excelled. The session will open on TUESDAY, October 15, 1867, and continue until the middle of March following.

Tickets for the course, $150, Matriculation, Demonstrators, and Diploma fees included.

For further information, see College Announcement, or address the Dean of the Faculty.

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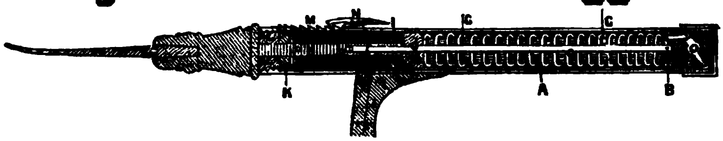
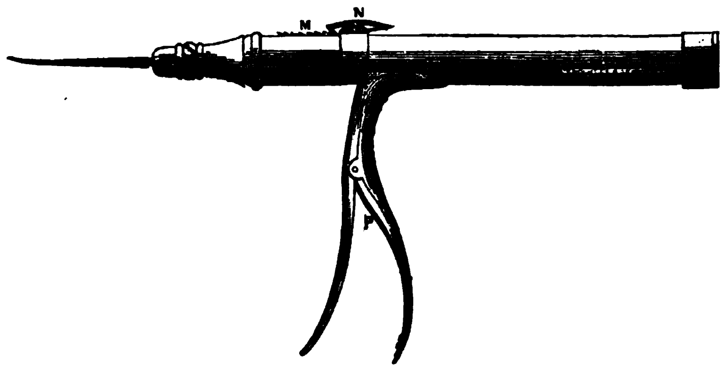
No. 25 West 27 Street New York.

Taylor's Automatic Plugger.





Of which the above gives a perspective verticle view. H represents revolving socket and shaft. L L. screw which retains the socket in its place and forms the base of rubber spring K. A A. hammer with wooden face and shaft of same. D double joint connecting hammer with crotched C. E upright rod with hook on same, passing over crotchet, and extending down to lever handle F. By closing of lever handle the hammer is raised and the upright rod slips off crotchet. It is readjusted by the steel spring P on lever handle, forcing it open and raising hook on upright rod over the crotchet.

The force of blow is obtained by weight of hammer A A and spiral spring G G, and is regulated by collar B and upright rods. O O connected with ring and hook N. M. notches for hook.

The advantages I claim for my Pluggers are these: it gives a perfect stroke without any pressure, which is an objection to all other pluggers, and without any adjustment it is always a pressure plugger, and at will a Mallet plugger it is the only instrument by which a direct lateral stroke can be obtained. They are twelve distinct strokes from a soft to a very hard one. The stroke may be increased or diminished by the mere movement of the thumb and fingers during the operation, without even taking the instrument from the patient's mouth if desired. By the rubber spring on the socket the full effect of the blow is obtained, and the socket is held in such a manner that it will not revolve only when desired. After the socket receives the effect of the blow, the point is instantly relieved by the contraction of the spring, thereby enabling the operator to fill a tooth that would be too sensitive to fill in any other manner.

This instrument was exhibited at the American Dental Association held at Cincinnati in August last, and was acceded to to be *far superior* to any other. The Michigan State Dental Convention at Detroit Oct. 8th, passed the following resolution: that we highly approve of the Automatic Plugger presented before this Association by Dr. S. C. Taylor of Toledo, that we believe it is well adapted to the purpose for which it is designed, and in many respeets is superior to any other in use, and that we as a convention return him our hearty thanks.

Mallet Plugger, German Silver, heavily plated..............	$20 00
Point Holder and Loosener..................................	3 00
Case Turkey Morocco....................................	3 50
One doz. Points...	3 50
	$30 00

☞Full Set Points contains 4 doz. at $3.50 per doz.

(Patent applied for.) All Orders will receive prompt attention.

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THE
AMERICAN JOURNAL
OF
DENTAL SCIENCE.

Vol. I. THIRD SERIES—FEBRUARY, 1868. No. 10.

ORIGINAL COMMUNICATIONS.

ARTICLE I.

Progress in Dental Mechanism. No. 4.

By Professor Austen.

In the first paper of this series, we briefly examined the Philosophy of Dental Progress; in the second, assigned the three principal causes of its unexampled rapidity; and in the third, gave illustrations of the last-named cause in connection with Dental Surgery; or, as it is commonly termed Operative Dentistry. In the remaining papers, dental progress will be illustrated by the numerous improvements in Dental Mechanism, which have so wonderfully developed the resources of this difficult and useful branch of Dental Art.

We would, by way of introduction, suggest for general adoption, a change in dental nomenclature, used by us for years past in our lectures. The term "operative dentist," has about as much significance as that of "practical plumber," suggestive of plumbers "in theory," and of dentists who either cannot or will not work.

As both departments of dentistry are largely mechanical, it is proper that the names of each should embody this peculiarity. The dentistry of "Prevention and Cure,"

dealing mainly with living organs, is more analogous to the work of the general surgeon: hence the term SURGERY, although etymologically of purely mechanical import, is peculiarly significant. The dentistry of "Replacement," deals also with natural organs: but most of the work is done in the laboratory, and is analogous to that of the Mechanical Arts: hence the term MECHANISM, significant of the "thing made," is chosen to point out this relation. DENTISTRY embraces under this nomenclature, DENTAL SURGERY and DENTAL MECHANISM.

Our illustrations of progress, in the latter department, will be taken somewhat in the order of the operations as usually done. First in order, and paramount in importance, in the work of "replacement," is the *impression*, which is the starting point of the whole mechanism. Improvements in the material used and in the means of applying it, must, it need scarcely be said, increase the usefulness of dental art.

Impression cups consisted originally of the fingers and thumbs; and nature's wax-holders are still the best, in certain cases, where a limited surface is to be copied, and where we require that delicacy of touch, to be found only in the ends of the fingers. Next in use were flat discs made of sheet tin (tinned-iron) with outer and inner rims soldered thereto, and the handle stiffened by an additional strip. To appreciate the superiority of the cups in present use (descriptions of which are unnecessary,) let us look for a moment at the properties essential to a good cup.

It must be of such shape as to retain the material. This rule applies to the use of plaster, which is not easily used in a badly shaped cup; and which, when in thin layer, requires some provision for its adhesion to the cup in the act of removal. Applied to wax-holders, it implies sufficient depth of rim to give lateral support and condemns all upper cup with the palatine surface cut out. The old-fashioned cups were thus made; but this shape suited the

old form of plates, before the introduction of the broad "atmospheric" base. The re-introduction of this shape, or of cups with a large palatine opening, is due to a mistaken idea that secondary pressure, with the thumb or fingers upon the wax projecting through such space, is better than the uniform pressure of the solid cup. Steady uninterrupted pressure in one direction is essential to a good impression; and the best cups are those which, permitting this, as far as possible, render unnecessary secondary pressure in any other direction.

Uniform thickness of the impression material is one of the most important of all the conditions of a good impression. Hence those cups are best which will give the most uniform space between cup and gum. The old cups were, in this respect, very defective; but modern skill has given us almost all that can be asked. For impressions of full cases, upper or lower, four or five sizes to each jaw will meet the requirements of all ordinary cases. With such cups the depots are abundantly supplied: why do they not keep a similar supply of a form of cup equally indispensable? We refer to the square-edged cup for partial cases, shaped thus to receive the remaining teeth. If compelled exclusively to use any one form, we should select this: for it is much more difficult to take a partial impression in a rounded cup than to take a full impression in a square edged cup. An admirable form is in the market—our complaint is of the limited supply, due to the possible fact that the profession generally are not aware of the advantages of this form of cup.

Rigidity, sufficient to withstand the pressure in taking the impression, is the third and last requisite. In this also the old cups were very deficient; many modern ones are unfit for any material except plaster, which requires no pressure. But manufacturers err sometimes on the other extreme and make cups too rigid. To make a few sizes most useful, we should be able to cut and bend to suit special cases, the dentist is here to blame often when

the manufacturer has done his duty. When strong enough to stand the pressure, and soft enough to be bent; yet the dentist fails to take a good impression, because the shape of the cup cannot or will not fit to the mouth, as might be done in a few moments.

It is unnecessary to argue the superiority of wax impressions in cups well adapted to the mouth. A simple experiment will show that a thick mass of wax can not copy a surface as accurately as when the layer is thin. Moreover the pressure made by the operator is transmitted unequally; those parts of the gum lying over the thicker portions of wax will be less compressed than others. There may be cases in which we desire this inequality: but as a rule the compression must be uniform. Accuracy in the impression is too important to permit such uncertainties, as arise from a badly adapted wax-holder.

The *Gutta Percha Cup* for plaster impressions is another valuable improvement. This will be at once seen from the fact that there is no mouth, however irregular, or whatever the position of any remaining teeth, which may not be accurately taken in plaster by the use of gutta percha cups. Necessity compelled us ten years ago, in applying the vulcanite to "partial cases," to contrive and gradually improve this form of cup. Others may have felt, and in a similar manner overcome, the difficulty. If so they will be prepared to confirm our statements—that plaster impressions are essential to accuracy, in a large class of partial pieces, made of vulcanite, or other plastic material—and that, except in a few cases, gutta-percha cups are necessary, in taking these impressions.

Gutta-percha is also very useful for taking plaster impressions, in those exceptional cases where the brittania mouth cups cannot, without troublesome alteration, be used. Such cases were formerly (and are still by many careful operators) met by the swaging of special impression cups.—a most accurate method, but also a trouble-

some one. This brings us to one of the most important services rendered by inventive skill, the saving to the dentist of that which he cannot replace when lost—his time.

Some hesitate to purchase a dozen cups, and think twice before cutting and bending a cup for a given case, least it should be unfit for further use: they thus value the time spent in swaging a cup at less than fifty cents. There is no folly of early professional life, that the dentist will afterwards regret more deeply, than that of making for himself, what he can purchase already made, and usually much better made. Economy is the frequent excuse: whereas it is a most spendthrift extravagance. "Practice" is another plea: but this is not admissible, until it can be shown that he is skilled in the construction of all kinds of intricate dental mechanisms. "Nothing else to do" is a far worse apology. The *science* of dentistry claims every moment that can be spared from the practical details of the *art*.

Dental depots elevate dentistry, most of all in this, that they relieve the workers in the profession of much of that drudgery of mechanism which, in years past, consumed valuable time, yet was necessary to a given end. True, many will use this time simply for the extension of business and so reckon the benefit at a monied valuation. But others, satisfied with their usual gains, devote the spare hours to intellectual culture; to these the benefit is priceless.

We close our remarks upon impression cups, by noticing one of those so-called improvements, such as cumber our laboratories with a host of contrivances, as useless as complicated. The "double cups," in which the wax is cooled by injecting a stream of cold water between the two layers, are worse than useless. How any one, who has once cooled a wax impression with a small napkin, chilled in ice water, or enclosing a thin tablet of ice, can give up so simple and easy an operation, for the trouble-

some and cumbrous cups above named, passes our comprehension.

To sum up briefly the contributions to dental progress, which the inventive genius of the last twenty years has rendered, in the single matter of impression cups—1. It has greatly increased the number of good impressions, by putting within the reach of every one cups well adapted to this purpose. 2. It has for the skillful few, who knew how to make cups for themselves, saved hours of unimproving handwork, which they have been able to devoted to the cause of science. 3. It has made the taking of plaster impressions, possible in any case, and easy in many, where they were before thought impracticable. In our next paper, upon *impression materials*, this third point will be more fully brought out.

ARTICLE II.

A Lecture on Caries and Necrosis of Bone,

Delivered Nov. 15, 1867, at the Baltimore College of Dental Surgery,

(Concluded.)

By H. R. Noel, M.D., Professor of Physiology.

Now as regards the phenomena of necrosis, Dr. Beale is equally unfortunate in his explanations. Dr. Beale says in necrosed bone, (*from occlusion of blood vessels* as he gives no other cause), the nutrient fluid not being able to pass through its regular channels, passes *around* and passes rapidly, so the germinal matter around, is here also too freely supplied with nutrient material. He thus explains the rapid production of germinal matter, cells, half formed tissue, &c., which rises around and invests the bone. A carious condition induced. This is another specimen of gratuitous assertion not sustained by the facts of the case.

An Haversian canal becomes occluded, and the fluid which should pass through, passes around it,—and all of the phenomena, of caries, &c., are produced by this excess of nutrient fluid in the tissue surrounding.

This involves two assumptions, the one a new idea and the other the view we have examined and refuted.

(1.) It implies that each tissue has its amount that passes through regularly in a given time, and if therefore it cannot get through by the usual channels, *it* must get through by others, and to do so, it makes up by rapidity, what it has lost in directness of rout.

This is rich, and when applied to secretions of saliva bile—milk, &c., gives us a rare physiological explanation of variable action in glands. It implies that the heart propelling the blood, sends amounts through tissues, determined by the size of the arteries, and ignores certain other forces concurred in the circulation. He gives the vis-a-tergo—but says nothing of the "vis-a-fronte."

Now in this very case we assert that the circulation is increased and *determined* by the "vis-a-fronte," and not by the "vis-a-tergo."

(2.) Assumption of premises and the deduction of conclusions therefrom is, as we have said—any thing than convincing.

But does excess of nutrient fluid determine the excessive production of germinal matter, &c., in necrosis? We think not.

In the ligature of the main artery of a limb, say the femoral, we have on a greatly magnified scale, the same condition of things that obtains when an Haversian canal is occluded. The current is obstructed in the main channels, seeks divergent and new channels, passes around through the tissues, converges beyond the ligatures and reenters the old channel below the ligature.

Here the germinal matter of the surrounding tissue has 50 or 100 times as much nutrient fluid passing it as is normally passed, and we would expect, if Dr. Beale's theory

And here we shall follow that admirable practical physiologist, Dr. T. K. Chambers, to whose lectures upon mucus and pus we have before referred.

You remember that Dr. Chambers begins the formation of mucus, by the arrest of development of a "mucous globule" (i. e. a small mass of germinal matter) upon or near the basement membrane of a mucous membrane, and pus is but a continuation of this same process. This "globule" has its vitality lowered, does not develop into an epithelial cell as it should do, but still retains enough of vital force to transform pabulum and to multiply by division, budding, &c. A few globules rapidly multiplying would use up a good supply of pabulum, and yet might form no well developed tissue ; in fact might produce only germinal matter, cells and loose tissue in excess ; or even mucus or pus. This is the true explanation of profuse suppuration. The vital power when too low, to exhibit the vital phenomena of transformation into tissue, may yet have the power of reproduction and power of transformation of pabulum into germinal matter, and we would have no well matured tissue, but an excessive amount of germinal matter, mucus or pus.

These changes progressing, and the pabulum being consumed, more is demanded—and more is obtained—hence the phenomena of increased circulation. This increase in circulation being the *result* of the active change going on, but, by no means the *cause* of these changes.

We quote the following from Chamber's lectures "Renewal of life," pps. 72 and 73.

"Is rapidity of multiplication to be looked upon as evidence for or against the force of vitality? Against I think.

The lower we go in the scale of creation, the more quickly and the more copiously, do the living forms representing the various classes reproduce their kind.

The less function and force and intensity of existence they have, the more prominent becomes reproduction as the main object of their being created. This seems to be the universal rule to be traced all through living beings, till we get down to the Amœba and the mould, in which *no trace of a function* can be detected beyond the multiplication of their substance.

And this is the law that obtains in the production of mucus—pus and even tissue; this is the true solution of the phenomena of caries. The cause of caries is not an excess of pabulum but deficient vitality. The germinal matter reproduces itself and multiplies rapidly in quantity and does not form tissue, not because of an excess of nutrient fluid, but because its vital power is lowered. It is devitalized and lacks intensity, and shows only the lowest form of vital force i. e. that of reproduction.

The decomposition of necrosed bone may give rise to chemical compounds, which exert a depressing or devitalizing influence upon the tissues and their germinal matter, this might and would cause all the phenomena described by Dr. Beale. We would have a rapid reproduction of germinal matter, cells and loose tissue, as the direct result of lowered vitality; and also an increased circulation around the necrosed bone produced by the increased demand for pabulum to support these active changes.

Caries and necrosis are therefore only different degrees of the same—devitalization. Caries is lowered vitality—necrosis is death. The cause acting might produce death in one part, and lowered vitality around, hence the two are so often found combined, being but different degrees of the same thing and dependent therefore upon the same cause.

The intensity of action of the cause, and the strength or feebleness of the part determining which condition shall obtain.

We conclude therefore that caries and necrosis are caused by agents acting upon the vital powers of the bone tissue, and that the attendant phenomena are fully explained by the views of Dr. Chambers.

That the "theory of Dr. Beale" is unphilosophical, unphysiological and superficial, and based upon assumptions which are false in fact and do him no credit as a physiologist.

ARTICLE III.

On our True and False "Knowledge" of the Physiological Character and Action of the Red-Blood Corpuscles.

(Concluded.)

By Rufus King Browne, M.D.

But the experimental demonstration of the fact, that the red-globules of the blood alone, become the appropriating agents of the oxygen of the air, in the lungs, is also demonstrative of the exact seat in the blood of the carbonic acid gas. It does this, as I think, most conclusively, by showing, that as the blood-globules which have passed the pulmonary circuit are replete with oxygen, they are *excluded* from being supposed to hold any of the carbonic acid contained in arterial as well as venous blood. Both bloods are well known to contain carbonic acid. On the old theory, which these various experiments contradict, that the blood-globules delivered oxygen to the tissues, suggesting that the globules received from them in interchange carbonic acid, it was but natural to suppose that they so received and carried the carbonic acid back to the lungs, for interchange with oxygen there, as they before had to the tissues, for interchange with carbonic acid. But it seems certain, that the seat in the blood of this gas must be the same in venous as in arterial blood. This seat in the latter we have shown is exclusively the plasma, by proving that in arterial blood the globules are replete with oxygen, and hence carry no carbonic acid gas.

The act of demonstrating that the globules *alone* on their way to the arterial system, take up and become the carrying seat of the oxygen, proves that the plasma is the seat of the carbonic acid in arterial blood. The demonstration that it is to the *plasma* they deliver it during their transit, and not to the tissues—dispensing entirely with that false theory,—leaves not the slightest reason for supposing that the globules take up the carbonic acid

from of the plasma in which it was held. If the blood-globules receive at the pulmonary surface, the oxygen and give it to the plasma, as it advances, it is certain that the latter gives it to the tissues, not alone, but incorporated with its other substances. The carbonic acid, is derived from the tissues by the plasma which bathing them, collects in the lymph canals, to flow into the venous blood.

To still hold to the supposition that not the plasma but the red-globules, in the venous system, hold the carbonic acid, demands the supposition that the globules take it up from the plasma of venous or else arterial blood, and moreover that they discharge it into the air of the lungs, and simultaneously appropriate the oxygen. How is it conceivable that the globules can, even while the carbonic acid is issuing from them, to the pulmonary surface, also be in the act of drawing in and appropriating oxygen beyond that surface. But *all* its carbonic acid, of the blood advancing from the pulmonary tissue, is found in its plasma, and identically the same proportion of carbonic acid exists in the plasma no-arterial as it did in the plasma in the capillaries of the lungs, *if* the *globules* specially exhaled all the carbonic acid gas, given to the air in the lungs. All these circumstances are identified with the supposition that the globules, (and they are prohibited by the facts,) hold the carbonic acid during any part of the circuit.

If the blood globules do *not*, and the plasma *does* receive the carbonic acid, from the tissues, not directly but by the lymphatics, we are entirely exempt from any reason for supposing that the red-blood globules ever take it up. *They certainly do not take it up from the tissues.* While the plasma *certainly* does contain it in all the blood which passes through the lungs, and contains it where it is demonstrated the globules do not, namely: after passing the lungs and throughout the arterial system. And in no other way as I conceive, can it be more conclusively established, that the carbonic acid does not enter the globules.

Our experiments prove that it is not upon the presence

of carbonic acid gas in blood, that the purple line supervenes, since instead of the presence of carbonic acid here, there must have been a loss of it ; and yet not with it, as we suppose, but *without* it, the blood lost its florid hue, on being reduced or on losing its oxygen, proving that the loss of the oxygen constitutes the loss of the scarlet. It is no less plain, therefore, that if the florid hue be certainly due to oxygen, to the loss of it, is as certainly due its reduction of color to purple, which is all simply the recurrence of the hue of its organic form and substance.

One fact is certain, that is, that the change of *color* in the red-globules of the blood, is entirely due not to its alternately taking up oxygen and carbonic acid, but to changes in the amount of oxygen alone it takes up ; this is demonstrated, and it leaves no room for the fancy, that at one moment the red-globules are completely occupied with "consuming" the oxygen, and the next moment are filled with carbonic acid. And this fancy is seen to be a mere figment of total unreality when it is observed that the most singular *in*distinction or indiscrimination and contradiction exists in the other concurring fancies of which it is an offshoot. One paragraph descriptive of these fancies makes the red-corpuscle the seat of oxydation, which gives off carbonic acid as the product of the union of its substance—its carbon and the oxygen it consumes, in these terms: "the fact that the blood corpuscles are capable *consuming* oxygen, and *giving of* carbonic acid, is an additional argument in favor of the *union* of these anatomical elements with the gas." [oxygen.] (Flint.) What kind of a *union* it is, which consists in the act of taking up oxygen and giving off carbonic acid, which arises from the union of the oxygen and the carbon of the globules, it is impossible to conceive. The union if any, here supposed, is that of the carbon and oxygen done in forming the acid gas—but this is done by the *dis*uniting of the carbon from the globule,—the essential first step of its union with the oxygen, and the "giving off" of

both. It is the substances *uniting* therefore which are the seat of the union, and not the globule which gives it off.

But this only shows by its absurdity, that the blood globule cannot normally both perform the transaction of consuming oxygen and giving off carbonic acid. Although the giving off would not be an act of the oxygen, seeing that its play is over for the time being when it has united with the carbon.

But we observe also, a fancy the converse of this; as follows:—"the plasma will absorb a *certain quantity* of oxygen; it first takes oxygen from the air and then gives it to the corpuscles."

This fancy, though it does not coincide with the previous one, is expressly formed to coincide with the notion that in the red-globules, is produced the carbonic acid. The latter notion we have shown is fallacious. Moreover our demonstration proves that the red-corpuscles in blood, after leaving the pulmonary capillaries, yield oxygen to the plasma: and it is certainly not probable that the plasma first receives it, from the air in the lungs, to give it to the globules, again instantly to receive it back from the globules. The one statement definitely implies, that of the whole of the oxygen inhaled—the plasma absorbing only a certain quantity, the globules will absorb the rest; and the other statement implies, that the former quantity the plasma first takes from the air, then gives it to the corpuscles. This phraseology, therefore, maintains that some of the corpuscles as well as the plasma simultaneously themselves, take oxygen from the air, while others are at the same time recipients of oxygen from the plasma.

But in observations, we ascertain that the corpuscles constitute almost the whole of the respiratory surface of the elements of the blood, in the situation where alone the oxygen is taken up, namely, in the pulmonary capillaries. The conditions do not permit our believing that *here* at least the plasma takes up the oxygen—much less that while some of the corpuscles take some, others in the

same respiratory act take none, and moreover that the plasma takes up some oxygen merely for the purpose of handing it over to some of the globules.

But amid the contradictions of the same compiler we have quoted from, we find one statement, which completely *disproves*, the preceding notions altogether. "Carbonic oxide which has a great affinity for the corpuscles, displaces almost immediately, ALL the oxygen *which the blood contains.*" [*Flint. Hum. Phy.*]

From these endless contradictions and embarrassments, the only possible mode of exemption is by the demonstrations we have already adduced. Our present predicament is due to the fact, that in the absence of knowledge or even thought, we had "faith" in those mutually destructive fancies, and have formed others coincident with them.

There is one experiment I have repeatedly performed, the circumstances of which seem indubitably to establish the facts respecting the true seat of the oxygen taken from the air of the lungs. If in an animal in which the cardiac action and circulation continues after poisoning with woorara, artificial respiration be suspended, the blood in its venous state, passes through the lungs into the left ventricle. Here the failure to change in the color of the blood in passing through the lungs is indubitably due to the failure to take up oxygen. But the seat of the color and of changes of color in blood, resides wholly in its *colored constituents* the red-corpuscles. And the failure to take up oxygen during the collapsed state of the lungs, and is identical with the failure to change color from dark to bright-red. Here we do not see how, without plain and evident denial of the facts, we can evade regarding this experiment as a demonstration which disproves the notion that the plasma is ever the seat of the incoming oxygen.

But we must now recur to the second experiment we named in the beginning; the experiment, namely, that the scarlet cruorine becomes purple or venous by yielding

the oxygen which makes it scarlet, to the liquid in which it is immersed whether serum or plasma. Now the substance *from* which the oxygen is taken, is not the substance which receives its supply from the fluid to which it habitually gives it. But if as, we have seen, the oxydizing process does not take place in each of the globules, at the expense and loss of so much of each of them as is supposed to be converted into carbonic acid, and if also this gas is not derived by them from the oxydation of the tissues, then the character of the process is such, (according to the supposition,) that they must deliver their oxygen into the plasma. For in order to take up carbonic acid, they must have first discharged their oxygen. This, the red-globules cannot in the nature of the case, directly impart or communicate to the tissues by bringing it into contact with their atoms, and hence they must yield it to the fluids with which they are in a contact so perfect, that the *substance* of the globule (apart from its form) is almost continuous with that of the plasma.

In the midst of these mutually contradictory and destructive suppositions, we have transcribed, we have been entirely unmindful of *our true* knowledge. This exists in a fact, long in our possession, which prohibits the entertaining of any supposition that the plasma takes up the oxygen from the air of the lungs. It definitely prohibits our acceptance of the notion, that the liquor sanguinis takes up the oxygen first from the air of the lungs and then serves it to the globule. This fact is, that, the liquor sanguinis, will not hold more than a 1-15 part of the oxygen the globules will, and hence the former *cannot* take up the proportion, to fill the globules, nor the proportion of oxygen actually taken up.

This fact definitely disposes of that eggregiously absurd supposition, that the liquor sanguinis and globules, *both* take up and carry both oxygen and carbonic acid: and taken together with the fact demonstrated by Bernard, that carbonic oxide in uniting with the red-

globules, for which it has a remarkable affinity, displaces *all* the oxygen of arterial blood, proves that it does not perform the office of *displacing* carbonic acid from the liquor sanguinis.

It is not really conceivable, that the globules discharge the carbonic acid, for it implies, since we know that they take the oxygen, that they both discharge carbonic acid, and take in the oxygen in the twinkling of an eye.

And all the demands of our intelligence are completely met upon this point, in the fact that the globules alone will absorb fifteen times more oxygen than the plasma, and hence the latter cannot possible take up as they are said to, and impart to the latter, the proportion of oxygen contained in arterial blood.

The only possible escape from all this endless embarassment, is to be found in the experimental evidence named throughout this article, that the oxygen is solely taken up and carried by the red-globules, and by it delivered to the plasma. That the latter is the exclusive carrier of the carbonic acid of the blood, and that the change of color from arterial to venous blood, is entirely due to the loss of oxygen by the globules to the plasma.

We have always considered this the case of one substance absorbed in the globule producing *one* color—purple, which had to be discharged or evacuated by another substance producing another color,—scarlet. If it were, as we *must* erroneously suppose, that the purple color was induced by the entrance into the globule of some substance, as the scarlet color is by that of oxygen, then the purple color could only occur by actual displacement of oxygen in it, by carbonic acid. But this purple remains under circumstances in which the carbonic acid gas is *not present*, and will only become scarlet on access of oxygen, showing that the change of color is not due to *impletion* of carbonic acid, but to access of oxygen. The same truth is apparent in the use of hydrogen, nitrogen, and carbonic acid. The red-corpuscle of venous blood

remains purple, in the absence of oxygen, though there be no carbonic acid present in it. Showing that the presence of carbonic acid in it, is not the *cause* of that color.

The venous hue, then, is not another and second color produced by the presence in the globule of another and different substance, which displaced the oxygen from it, and thereby gives a new color to it, driving out the scarlet, which changes the scarlet, to purple simply because they cause the *loss* of the oxygen.

The presence of the scarlet hue presupposes the prior *existence* of the purple hue, due simply to loss of oxygen. I have said this was not a process of "oxydation," as presented in the supposition that the globules consume oxygen, and "*give off*" carbonic acid, and this is plain to the very least intelligence, and the acceptance of a *contrary* supposition, shows how little intelligence we have exercised. By this supposition it is presupposed that the red globules first take up the carbonic acid from the rest of the blood or the tissues, and give it to the plasma (which is contradicted by another supposition, that the carbonic acid is formed by oxydizing of their own substance,) or else that the carbonic acid they give off, is that *portion* of themselves which had become carbonic acid by oxydation. But the first of these is contradicted by another supposition, viz.: that it is the plasma, not the globules, from which the oxygen of the air displaces the carbonic acid in the lungs. And the second itself is contradicted by the fact, which satisfies all the demand of our knowledge, that the anatomical form of the globules could not be maintained, during a single round of the circulation, if they really were oxydized, or their substance converted into *carbonie acid*, or any product of oxydation. In which case they could not take up oxygen a *second* time, which presupposes in the meantime, that the globules are devoid both of carbonic acid, that being in the plasma, when it is displaced and not in them ; and devoid of oxygen, until the regular course of proceeding of displacing the carbonic acid, taking up the oxygen,

and giving it up to them. At every new sentence we are confronted by some one of these contradictory statements, and no one of them is uncontradicted by some other one.

An example, that we constantly make statements which we have not exercised the least intelligence of the character of, is found in the statement, that "the elements of the blood which absorb the *greater part* of the oxygen, are the red-corpuscles."—(*Flint. Hum. Phy.*)

As if some of these corpuscles coming nearest to the air did, and others did *not*, (or were prevented from), absorbing oxygen. And the error is worse when we consider that the plasma could not in fact give to these globules a fraction of one per cent. of the oxygen they themselves are found to hold. How too are the globules going to get it? Here are a set of bodies, most peculiarly fitted for this work of taking up oxygen, without which we should be absolutely at a loss, to account for its being taking up in respiration. They will and *do* take up fifteen times as much as the liquid in which they are suspended. Their form and dimensions,—all their anatomical characters, are precisely those which show peculiar adaptation to this function. And, yet while we are in the act of regarding *these facts*, we say that they take up the oxygen which is supplied by asserting that they only take up the "greater part" of the oxygen, and the plasma the rest. Look at the enormous surface they present to the approach of the oxygen as compared with a fluid surface, say of the linear measure of a fraction of one inch. And if the oxygen come in contact with various points of the surface of each of them the corresponding number of atoms of the oxygen, over that of the plaen surface of a fluid, is enormously increased. Still, we suppose the globules do not take up the oxygen *actually* taken up, but only the "greater part" of it, and even this, itself the statement of an error, we contradict by saying that "the plasma first takes up the oxygen and gives it to the globules."

According to this most egregious of all blunders, we

have to suppose either, that only a certain proportion or number of globules present in the lung capillaries, during each inspiration, take up the due proportion of oxygen they are found to have, while some other of the globules, do not take any, except as furnished afterward by the plasma, or else that the globules do not directly of themselves take up their due amount of oxygen, but taking up directly a certain deficient amount, the plasma gives up to them what constitutes the complement of the due proportion they hold.

But this supposition is contradicted by another, the absurdity of which is, if possible, still more monstrous, namely, that the plasma first takes the oxygen and then gives it to the globules. (*Flint. Hum. Phy.*) Now, this is said of the plasma, which, according to the same author, who adopts both the preceding suppositions,—will take up about 1-15th the amount of oxygen the globules will. So that, if the plasma, first takes the oxygen during inspiration, it must absorb as much as it can, *fifteen times in succession, each act of inspiration,* in order to supply the globules with the amount they will hold. Since, however, the plasma cannot in inspiration take up more than once, the small percentage it holds, this supposition requires us to believe that, if the plasma, first takes up the oxygen from the air, that the sole amount of oxygen the globules get is about six per cent. of what *in fact* they actually contain after passing through the pulmonary capillaries ; and the same want of intelligence, is shown in an interpretation put upon an experiment of Stevens, who, " After removing the serum from a clot by repeated washings, with pure water, found that the color remained black when exposed to the air, but was reddened by the addition of its serum From this he reasoned that the red color of the arterial blood, is due to the saline constituents of the plasma."

Comment : " This is true, but the saline constituents of the plasma, affect the color indirectly, by *maintaining* the anatomical integrity of the corpuscles.—(*Flint. Hum.*

Phy. Cir. p. 456.) The *facts* of the experiment are not even hinted at or implicated in the interpretation of the author who cites it. For the plasma was not permitted to hold the globules, and was, therefore, especially removed from any effect of "*maintaining*" the anatomical integrity of the corpuscles. The globules were specially *deprived* of this condition of their integrity, and no means was employed to preserve it, nor could the serum used have possibly *preserved* this integrity, for it was not used until the change was actually accomplishod. Whatever the effect, which occurs, of the separation of the globules and plasma, actually *did* occur in this instance, and yet the interpretation put upon it, ignores all the facts.

And will then, dark *venous* blood *redden* merely by keeping up its "anatomical integrity," or worse than this, will this blood when it has *not* changed from venous hue to red, on exposure to both air and oxygen, in time *redden* on contact with serum, without any other cause than this, *erroneously* supposed, preservation of the integrity of the corpuscles, which we have shown was not the characteristic fact of the experiment? The answer to this is plain. The change of color by the serum, was wholly due to the oxygen it contained, derived from the clot itself. But however this may be, the interpretation put upon the experiment by the author we have quoted, exemplifies an entire want of intelligence in regarding the facts. Such monstrous absurdities as these, we say, credited in the very presence of the facts, show that our intelligence *has not yet come to the birth* regarding them; for it is plain to even an instant exercise of intelligence, that no wilder errors could be imagined.

In any situation, in or out of the blood channels, the red blood corpuscle shows palpably to the senses, the possession of truly organized characters. The changes of contour and character so far as these are appreciable to sense it invariably undergoes, even where it is carefully and effectually protected from gross physical influences

are not due to any *action* upon it, of outward agents by which it is deprived of its wet constituents, but are the variations in an organic form prior to final passage from organic to exorganic substance but which is one of inert waste. These changes show how widely different its normal state is from any mere inert mass of matter. These changes would probably be prevented rather than be *caused* by such external influences. As they exist, however, out of the body, and it goes through certain characteristic stages of changes, even if we consider the last it comes to as one of inertia or organic death—it is demonstrated that it commenced these changes in a very different state, from that of inertia. From one state it undergoes a series of abrupt changes which ultimate in another state. If the latter is one of inertia or organic decease, the former was *not*, for the changes mark the passage from life to death. Surely these changes take place, *not* in inert matter only chemically formed and moved, but in the most highly organized matters;—i. e. in substances, which not alone in material constitution, but in *character*, are vivid. The failure to recognize this truth is, I am convinced, explicable on no other assumption, than that we habitually, whether from a state of childish ignorance or not—*fail to reflect for a moment* on facts of this character. The fact of the changes which demonstrate the great difference between the red-blood corpuscle and any kind of matter of chemical nature and *not* vivid, are precisely the same, whether we attribute them to outer influence or not. That they would not so change in the blood channels only furnishes another kind of proof or demonstration of their highly vivid character. for there they maintain it for a certain definite term of life.

ARTICLE IV.

Bichloride of Methylene.

Dr. B. W. Richardson, so well and favorably known by his researches upon anæsthesia, and his additions to our

armamentarium in this direction has recently introduced a new anæsthetic, to which we propose to devote a little attention.

Bichloride of methylene belongs to the monocarbon group of organic compounds; that is to say, its radical is one of those, into the composition of which a single atom of carbon enters. If we take for example, *marsh gas;* which is a tetrahydride of carbon, and which may be written CH_4, we shall find that we can express its composition by the formula, CH, H_3, which indicates that it may be considered a hydride of methyl, CH_3 being the expression for that radical. A very good reason for this opinion is found in the reactions of chlorine with marsh gas. Chlorine may substitute the hydrogen, to form the chloride of methyle, CH_3Cl. The action may go further than this, and two equivalents of chlorine may substitute two equivalents of hydrogen, when the radical will be decomposed to methylene, CH_2, and we shall have the formula CH_2Cl_2, or bichloride of methylene, the substance under consideration. Nor need the action stop here. The last-named radical may be still further reduced to CH, or formyl, by the substitution of three atoms of hydrogen by three of chlorine, and this will give us $CHCl_3$, terchloride of formyl or chlorroform. Indeed the whole of the hydrogen may be substituted by chlorine, and then we have CCl_4, tetrachloride of carbon.

It is remarkable that every one of these substances possesses anæsthetic powers. That our readers may see their relations at a glance, a table is subjoined.

C H_2 H;	Marsh Gas (Hydride of Methyl.)
C H_3 Cl;	Chloride of Methyl.
C H_2 Cl_2;	Bichloride of Methylene.
C H Cl_3;	Chloroform.
C C4l;	Tetrachloride of Carbon.

To complete the view of this series, there may be added the formula $\left.\begin{matrix}C\,H_3\\H\end{matrix}\right\}$ 0—Methylic Alcohol—Wood Spirit or Naphtha.

It might be supposed that the whole series possessed anæsthetic properties in various degrees. Dr. Richardson, however, experimentally determined that pigeons, birds known to be extremely sensitive to anæsthetics, could live in an atmosphere containing thirty-five per cent. of hydride of methyl, marsh gas, or fire damp (for it goes under all these aliases) for half an hour, and that he himself could breathe with impunity the air coming from their chamber. When death is produced, it occurs in a gentle sleep. The lungs, heart and blood retain their natural conditions, and resuscitation is easily accomplished. Of the anæsthetic action of the other members of the series, we shall speak after we have paid some attention to the main subject of our remarks.

Bichloride of methylene is prepared by the action of sulphuric acid on zinc in chloroform, the nascent hydrogen substituting an equivalent of chlorine which is converted into hydrochloric acid. Thus:

$$C\,H\,Cl_3 + 2\,H = C\,H_2\,Cl_2 + H\,Cl.$$

It is a colourless liquid, with an odour resembling that of chloroform. Its boiling point is 88° F., its specific gravity 1.344, its vapour density 2.937. (Regnault makes it 3.012.) The following table exhibits its relation to its congeners, at a glance.

	Boiling Point. F.	Spec. Grav. Water=1.	Dens. Vap Air=1.
Chloride of Methyl,	6°		1.745
Bichloride of Methylene,	88°	1.344	2.937
Chloroform,	142°	1.495	4.122
Tetrachloride of Carbon,	172°	1.599	5.321
Ether ($C_2\,H_5O$)	92°	0.720	1.547
Amylene ($C_5\,H_{10}$)	95°	0.659	2.419

It will be seen that it boils at a lower temperature than any of these liquids, not excepting ether. The boiling point of this latter, however, so nearly approximates that of the new anæsthetic that they can be mixed together and be vaporized equally, thus obviating an objection to which

the mixture of chloroform and ether is liable. It is also miscible with chloroform in all proportions.

The establishment of anæsthesia by this agent is not so speedy as by chloroform. The subject yields gradually to its influence, the most marked peculiarity of its action being the absence of Snow's second stage of anæsthesia, or that of excitement. It enters readily into the circulation, and keeps up the insensibility so well that it does not require to be frequently re-administered. Herein, it differs from ether and amylene which produce a much briefer narcotism. In pigeons it occasionally produces vomiting. Whether this unpleasant circumstance will attend its action upon the human subject, experience must determine. The recovery is quiet and complete.

It should be administered upon a sponge, in a balloon or Clover's bag, or from a funnel. Snow's inhaler presents too small a surface for evaporation. In the earlier stages of administration, a little more of this substance should be given than of chloroform, as it is more easily vaporized and the loss is greater. One drachm of bichloride of methylene corresponds to forty grains of chloroform.

When the action of the remedy is pushed to a fatal issue, Dr. Richardson informs us that the resistance to death is as fourteen to five in favour of bichloride of methylene against tetra-chloride of carbon, and as fourteen to nine against chloroform. Equally marked differences in the action of these anæsthetics on muscular irritability have been observed. Tetrachloride of carbon extinguishes this vital activity of muscles in seven minutes, chloroform in twenty-three minutes, and bichloride of methylene in fifty-eight minutes. Dr. Richardson has also observed a difference in the action of these different chlorides upon the lungs and heart. Chloroform leaves the lungs bloodless, the right cavities of the heart engorged, and the left cavities empty. Carbonic acid, and occasionally in a less degree, ether and tetrachloride of carbon, leave the lungs congested and both sides of the heart containing blood.

Where death occurs from bichloride of methylene, the lungs and both sides of the heart contain blood, but they are not unduly distended.

The energy of these anæsthetics would seem to be proportioned to the amount of chlorine they contain. Thus, chloride of methyl produces sleep, and can, if used in sufficient quantities, destroy life. Muscular irritability remains an hour after death. Dissolved in water and drunk it produces intoxication, which is, however, of short duration. The most dangerous of these agents is believed to be tetrachloride of carbon, which certainly contains the largest proportion of chlorine. The remarks already made show the relation of the other members of the series.

Several cases have been reported in which the new anæsthetic has been employed in severe surgical operations on the human subject. In all the most satisfactory anæsthesia has been obtained, and in none have any untoward symptoms been observed.

SELECTED ARTICLES.

ARTICLE V.

The Use and Abuse of Tobacco.

[We would call especial attention to the following letter from Sir Benjamin Brodie. The long and extensive experience and mature judgment of the writer entitle his opinions to the greatest weight.]

"Sir: Having been applied to some time since to join in a petition to the House of Commons, that they would appoint a committee to inquire into the effects produced by the prevailing habit of tobacco smoking. I declined to do so; first, because it did not appear to me that such a committee would be very competent to discuss a question of this kind; and, secondly, even if they were so, I

did not see that it would be possible for Parliament to follow up by any act of legislation the conclusions at which they might have arrived. Nevertheless I am ready to admit that the subject is one of no trifling importance, and well worthy the serious consideration of any one who takes an interest in the present and future well-being of society. From these considerations it is that I now venture to address you the following observations.

"The empyreumatic oil of tobacco is produced by distillation of that herb at a temperature above that of boiling water. One or two drops of this oil (according to the size of the animal) placed on the tongue will kill a cat in the course of a few minutes. A certain quantity of the oil must be always circulating in the blood of an habitual smoker, and we cannot suppose that the effects of it upon the system can be merely negative. Still, I am not prepared to subscribe to the opinion of those who hold that, under all circumstances, and to however moderate, an extent it be practiced, the smoking of tobacco is prejudicial. The first effect of it is to soothe and tranquilize the nervous system. It allays the pains of hunger, and relieves the uneasy feelings produced by mental and bodily exhaustion. To the soldier who has passed the night in the trenches before a beleaguered town, with only a distant prospect of breakfast when the morning has arrived; to the sailor, contending with the elements in a storm; to the traveller in an uncultivated region, with an insufficient supply of food, the use of a cigar or a tobacco pipe may not only be a grateful indulgence, but really beneficial. But the occasional use of it under such circumstances is a very different matter from the habit of constant smoking which prevails in certain classes of society at the present day.

"The effects of this habit are, indeed, various, the difference depending on difference of constitution, and difference in the mode of life otherwise. But, from the best observations which I have been able to make on the sub-

ject, I am led to believe that there are very few who do not suffer harm from it, to a greater or less extent. The earliest symptoms of it are manifest in the derangement of the nervous system. A large proportion of habitual smokers are rendered lazy and listless, indisposed to bodily and incapable of much mental exertion. Others suffer from depression of the spirits, amounting to hypochondriasis, which smoking relieves for a time, though it aggravates afterwards. Occasionally there is a general nervous excitability, which, though very much less in degree, partakes of the nature of the *delirium tremens* of drunkards. I have known many individuals to suffer from severe nervous pains, sometimes in one, sometimes in another part of the body. Almost the worse case of neuralgia that ever came under my observation was that of a gentleman who consulted the late Dr. Bright and myself. The pains were universal and never absent; but during the night they were especially intense, so as almost wholly to prevent sleep. Neither the patient himself nor his medical attendant had any doubts that the disease was to be attributed to his former habit of smoking, on the discontinuance of which he slowly and gradually recovered. An eminent surgeon, who has a great experience in ophthalmic diseases, believes that, in some instances, he has been able to trace blindness from amaurosis to excess in tobacco smoking; the connection of the two being pretty well established in one case by the fact that, on the practice being left off, the sight of the patient was gradually restored. It would be easy for me to refer to other symptoms indicating deficient power of the nervous system to which smokers are liable; but it is unnecessary for me to do so; and, indeed, there are some which I would rather leave them to imagine for themselves than undertake the description of them myself in writing.

"But the ill effects of tobacco are not confined to the nervous system. In many instances there is a loss of the healthy appetite for food, the imperfect state of the diges-

tion being soon rendered manifest by the loss of flesh and the sallow countenance. It is difficult to say what other diseases may not follow the imperfect assimilation of food continued during a long period of time. So many causes are in operation in the human body which may tend in a greater or less degree to the production of organic changes in it, that it is only in some instances we can venture to pronounce as to the precise manner in which a disease that proves mortal has originated. From cases, however, which have fallen under my observation, and from a consideration of all the circumstances, I cannot entertain a doubt that, if we could obtain accurate statistics on the subject, we should find that the value of life in habitual smokers is considerably below the average. Nor is this opinion in any degree contradicted by the fact that there are individuals who in spite of the inhalation of tobacco smoke live to be old, and without any material derangement of the health; analogous exceptions to the general rule being met with in the case of those who have indulged too freely in the use of spirituous and fermented liquors.

"In the early part of the present century tobacco smoking was almost wholely confined to what are commonly called the lower grades of society. It was only every now and then that any one who wished to be considered as a gentleman was addicted to it. But since the war on the Spanish Peninsula, and the consequent substitution of the cigar for the tobacco-pipe, the case has been entirely altered. The greatest smokers at the present time are to be found, not among those who live by their bodily labor, but among those who are more advantageously situated, who have better opportunities of education, and of whom we have a right to expect that they should constitute the most intelligent and thoughtful members of the community. Nor is the practice confined to grown-up men. Boys, even at the best schools, get the habit of smoking, because they think it manly and fashionable to do so;

not unfrequently because they have the example set them by their tutors, and partly because there is no friendly voice to warn them as to the special ill consequences to which it may give rise where the process of growth is not yet completed, and the organs are not yet fully developed.

"The foregoing observations relate to the habit of smoking as it exists among us at the present time. But a still graver question remains to be considered. What will be the result if this habit be continued by future generations? It is but too true that the sins of the fathers are visited upon their children and their children's children. We may here take warning from the fate of the red Indians of America. An intelligent American physician gives the following explanation of the gradual extinction of this remarkable people: One generation of them became addicted to the use of fire-water. They have a degenerate and comparatively imbecile progeny, who indulge in the same vicious habit with their parents. Their progeny is still more degenerate, and after a very few generations the race ceases altogether. We may also take warning from the history of another nation, who some few centuries ago, while following the banners of Solyman the Magnificent, were the terror of Christendom, but who since then, having become more addicted to tobacco smoking than any of the European nations, are now the lazy and indolent Turks, held in contempt by all civilized communities.

"In thus placing together the consequences of intemperance in the use of alcohol and that in the use of tobacco, I should be sorry to be misunderstood as regarding these two kinds of intemperance to be in an equal degree pernicious and degrading.

"The inveterate tobacco smoker may be stupid and lazy, and the habit to which he is addictad may gradually tend to shorten his life and deteriorate his offspring, but the dram drinker is quarrelsome, mischievous, and often criminal. It is under the influence of gin that the

burglar and the murderer become fitted for the task which they have undertaken. The best thing that can be said for dram-drinking, is that it induces disease, which carries the poor wretch prematurely to the grave, and rids the world of the nuisance. But, unfortunately, in this, as in many other cases, what is wanting in quality is made up in quantity. There are checks on one of these evil habits which there are not on the other. The dram-drinker, or, to use a more general term, the drunkard, is held to be a noxious animal. He is an outcast from all decent society, while there is no such exclusion for the most assiduous smoker.

"The comparison of the effects of tobacco with those of alcohol leads to the consideration of a much wider question than that with which I set out. In all ages of which we have any record, mankind have been in the habit of resorting to the use of certain vegetable productions, not as contributing to nourishment, but on account of their having some peculiar influence as stimulants or sedatives (or in some other way) on the nervous system. Tobacco, alcohol, the Indian hemp, the kava of the South Sea Islanders, the Paraguay tea, coffee, and even tea, being to this category. A disposition so universal may almost be regarded as an instinct, and there is sufficient reason to believe that, within certain limits, the indulgence of the instinct is useful. But we must not abuse our instincts. This is one of the most important rules which man, as a responsible being, both for his own sake and for that of others, is bound to observe. Even such moderate agents as tea and coffee, taken in excess, are prejudicial. How much more so are tobacco and alcohol, tending, as they do, not only to the degradation of the individual, but that of future generations of our species.

"If tobacco-smokers would limit themselves to the occasional indulgence of their appetite, they would do little harm either to themselves or others; but there is always danger that a sensual habit once begun may be carried

to excess, and that danger is never so great as in the case of those who are not compelled by the necessities of their situation to be actually employed. For such persons the prudent course is to abstain from smoking altogether.

"Trusting that you and your readers will excuse me for occupied so large a space in your coulums,

"I am Sir, your humble servant,

"Aug. 17. B. C. Brodie."

—(*Med. Times and Gaz.*)

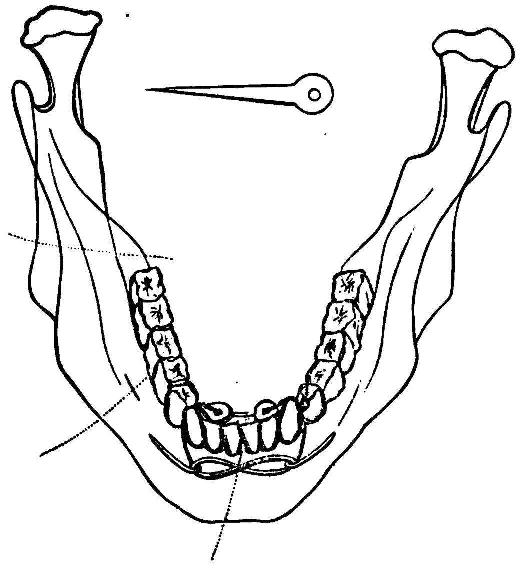
ARTICLE VI.

New Mode of treating Complicated Fracture of the Lower Jaw—Simple and Compound Fracture of Lower Jaw; Compound Comminuted Fracture of Right Forearm; Amputation; Recovery.

The following case is worthy to be placed on record, not on account of the special features it presents, but also as illustrating the fact that the surgeon is occasionally called upon to devise some new and special method of treatment, in order to overcome difficulties not usually met with in similar cases. Mr. T. E. G. Bywater has obliged us with notes of the case.

Joseph R——, a mill hand, residing in Leeds, was admitted into the hospital October 27th, 1864. He had been caught in the gearing of machinery in motion, carried round a shaft before the engine could be stopped, and finally dashed to the ground with great violence. On examination, he was found to have sustained the following injuries:—1. Compound comminuted fracture of the forearm. The tissues of the limb were disorganised; the bones broken up; muscles, vessels, and nerves torn, and so crushed as to render any idea of saving the limb altogether hopeless. 2. A severe contused and lacerated wound of the left cheek, communicating directly with a fracture of the lower jaw, and extending upwards on the

face for two inches and a half or three inches. The jaw had sustained three fractures: one at the symphysis, a second immediately in front of the insertion of the masseter muscle, and a third through the ramus of the bone and base of the coronoid process. The face and right side of the neck were much contused and ecchymosed. 3. There was a considerable amount of extravasated blood in and around the left orbit, and also between the sclerotic and conjunctiva of the eyeball of the same side; this effusion terminated abruptly at the margin of the cornea. There was no oozing of blood from either ear, nor from the nose, nor through the pharynx. The same evening, circular amputation of the forearm was performed about five inches below the point of the elbow, and the wound was brought together by wire sutures, and supported by strips of plaster and a bandage. The face was so swollen and bruised that no mechanical support could at this time be applied to the fractured jaw, and a little warm lead lotion was therefore ordered.



Oct. 30th.—Reaction has passed off and the patient is

doing well; stump dressed: wound looks healthy, and is free from any appearance of sloughing.

The question of the treatment to be adopted in order to keep the fragments of the jaw in good position now came under consideration, and proved a very complicated one. The portion of the bone extending from the symphysis to the edge of the masseter was exceedingly loose, and, on examining it carefully, was observed to be so far dragged downwards by the action of the depressor muscles that the upper border of the incisor teeth of the fractured side was exactly on a level with the base of the bone on the sound one. It could be restored to its normal position without the application of any great amount of force, but extreme difficulty was experienced in retaining it there. The means that suggested themselves for this purpose were, first, the usual moulded external splint and bandage; but the use of any such appliance as this was rendered impossible by the presence of the large lacerated wound mentioned above. Secondly, lashing the teeth together by silver wire was very carefully tried; but, unfortunately, they were so closely imbricated, and were directed so unusually inwards that the ligatures could not be so applied as to maintain their hold, but slipped as often as the attempt was repeated.

The case was now seen by several surgeons, and the aid of a dentist was also sought, but no feasible plan was sugdested at the consultation.

On the following day Mr. Wheelhouse carried out an idea which had, in the meantime, suggested itself to his own mind, and which in the end proved so thoroughly successful and so little innonvenient to the patient as to make him think it worthy of publication.

Two silver pins were made, with flat, circular, and *perforated* heads, each pin being about an inch and a quarter in length. Two holes were bored with an Archimidean drill through the substance of the jaw-bone—one between the roots of the outer incisor and canine teeth of the un-

broken side, and the second between the roots of the same teeth of the fractured side. Through these holes the two pins were passed *from behind forward,* the perforated heads, threaded with a good stout silk ligature, resting upon the floor of the mouth under cover of the frænum of the tongue. Having been well thrust forward through the drill-holes, the points were bent in opposite directions, the loose fragment was placed in good position, the ligature was brought forward over the teeth, and a figure-of-8 suture was then made round the reversed ends of the pins.

By this means perfect apposition was secured. The wound in the soft tissues of the face was allowed to granulate untrammeled by external pressure. The patient was enabled to take food easily and well, and, in short, made so excellent a recovery that he left the hospital on the 26th of November, exactly a month from the date of his admission, with his wounds all healed, his jaw moderately firm, and the line of his teeth perfect.—*London Lancet.*

ARTICLE VII.

On the Various Risks of Operations.

By JAMES PAGET, F. R. S., (delivered at St. Bartholomew's Hospital.)

LECT. I. Part II.—The foregoing, so far as I have been able to learn them, are the various risks of patients with admitted morbid constitutions. The importance of being able to decide the questions arising in such cases must be evident to you. And questions of equal importance, and yet of greater difficulty, arise in the cases of many who may not be called diseased, but who certainly are not in any just sense of the word healthy, such as the plethoric, the over-fat, the intemperate, the over-fed, the feeble, the degenerate, the cold-blooded. What can be safely said about these, and of the dangers they severally incur when we wound them? I will try to tell what I believe.

Plethora, pure and simple, is not a bad condition for operations. So far as I have seen, people that have been full-blooded, ruddy, warm, round-limbed, tight-skinned, with strong hearts, and, as we suppose, a rather excess of blood, have done well. But such people must be carefully managed ; not fed too well ; not kept too long in bed ; not allowed to retain their refuse ; and mere bigness must not be taken for plethora.

For the over-fat are certainly a bad class, especially when their fatness is not hereditary, but may be referred in any degree to their over-eating, soaking, indolence, and defective excretions. The worst of this class are such as have soft, loose, flabby, and yellow fat ; and I think you may know them by their bellies being pendulous and more prominent than even their thick, subcutaneous fat accounts for ; for this shape tells of thick omental fat ; and, I suppose, of defective portal circulation. I know no operations in which I more nearly despair of doing good than in those for umbilical hernia or for compound fractures in people that are over-fat after this fashion. Nothing short or the clearest evidence of necessity or of great probable good, should lead you to advise cutting operations in people of this kind. Do lithotrity for them rather than lithotomy ; incline against amputations for even bad compound fractures ; and, wherever you can—as, for instance, cutaneous cysts, hæmorrhoids, and the smaller examples of scirrhous mammary cancers—use caustics rather than the knife or ligature.

All these warnings must be doubled for the intemperate. One does, indeed, sometimes meet with habitual drunkards who pass safely through the perils of great operations ; but these are rare exceptions to the rule, according to which one may reckon that the risks of all operations increase with the increasing degrees of habitual intemperance. I think you will find that a habit of slight intemperance is much worse than occasional great excesses ; that regular soaking is worse than irregular carou-

sing; probably because of the steady impairment of the blood and of all the textures to which the soaking leads. Of course you will keep your hands off notorious drunkards, unless you are driven by the stress of a stangulated hernia, or stopped windpipe, or something leaving you as little choice as these do. But you must be on your guard to detect a good deal of drunkenness of the soaking kind which is not notorious and not confessed. Be rather afraid of operating on those, of whatever class, who think they need stimulants before they work; who cannot dine till after wine or bitters; who always have sherry on the sideboard; or are always sipping brandy-and-water; or are rather proud that, because they can eat so little, they must often take some wine. Many people who pass for highly respectable, and who mean no harm, are thus daily damaging their health, and making themselves unfit to bear any of the storms of life.

On all such as these, operations are more than doubly hazardous. Of course you may hear of wondrous escapes from dangers, and, on the credit of a few exceptions, silly proverbs are made about the impunity of drunkards; but the general rule is certain. Every risk of an operation is increased in the habitually intemperate; they are, above the average, liable to every one of all the sources of danger and of death.

I have had no sufficient experience among teetotalers to enable me to speak with any certainty of their capacity for bearing operations. I cannot doubt that a patient trained all his life, to habits of rigid temperance would bear injuries of all kinds better than the average of men; but people of this sort are not commonly those with whom you have to do under the name of teetotalers. These are, much more commonly, such as have been intemperate, or, to say the least, imprudent in their manner of living, and have then wholly changed their habits, and lived without any stimulants whatever. Of such people I have no good opinion when they come to be the subjects of surgery; for

they seem to retain the bad liabilities of the intemperate long after they have given up their bad habits. I would not adopt the opinion that I have heard some express, that teetotalers are worse patients than drunkards; but I should always expect that a very long period of reformation would be required to free a man from the damages he has sustained by intemperance.

Over-eating is not commonly supposed to lead to any such risks of life as over-drinking does; yet I believe that you will find, in operative surgery, that among the habits that increase the risks of life, this may stand not far off drunkenness, especially if the other-eating is of meat and other nitrogenous foods. I am led to believe this from several cases that I have observed, and I think that there are large evidences of it. You know that the general results of operations in provincial hospitals tell of a smaller mortality than in the hospitals of London and the largest towns. The difference is commonly ascribed to differences in the purity of the air, and other advantages of that kind in the comparatively rural districts. I believe that much more of it is due to the differences of habits in the several classes of patients. The differences are many; but one of the chief of them is that of the poor in the agricultural districts eat far less meat than those in large towns do, and are, by comparison, less fed, though probably not worse fed, and you may frequently observe that patients who come to us from agricultural districts bear operations in all respects, better than Londoners who are submitted to the same proceedings. Of course many things occur to make the differences of constitution between a town and a country population; but I am satisfied that among these things a very potent influence is exercised by the difference of diet. And the differences that we may thus see are strongly illustrated by what one hears of the results of operations upon the natives of India and other Eastern countries, whose diet is almost exclusively vegetable. Almost any amount of injury may be inflicted on them, and

not be followed by the destructive mischiefs which occur in Europeans under the same circumstances. They are defective, it is said, in healing power; but they recover with comparative certainty, however slowly, from operations of the greatest magnitude. A common expression about them is, "You can't kill them."

(To be Continued.)

CORRESPONDENCE.

Susquehanna Dental Association.

WILLIAMSPORT PA., *Jan,* 17, 1868.

At a regular semi-annual meeting of the Susquehanna Dental Association, held at Milton, Pa., January 15, 1868, the following resolution with reference to the course pursued by the Dental Vulcanite Co., towards the Dental profession, was unanimously adopted, and the co-operation of the profession throughout the country solicited, to the end that no further annoyance may arise from that source:

RESOLVED, That the members of this Association consider the action of the so-called Goodyear Dental Vulcanite Company irregular, unjust and an absolute imposition; and that, as a body, we will discard and discourage the use of hard rubber for dental purposes, and adopt such substitutes as we may severally prefer.

By order of the Association.

M. D. L. DODSON,
Secretary.

MONTHLY SUMMARY.

Ozone.—The real nature of this curious substance has long been debated. Schœnbein thought it was negative oxygen and called all substances that evolved it *ozonides.* He supposed that there must be an opposite or positive variety of oxygen, which he named *antozone,* and he believed that ordinary oxygen was a

compound of these two which mutually neutralized one another. This notion was successfully combatted by Sir B. C. Brodie. In 1860, Andrews and Tait showed that 100 volumes of oxygen subjected to the electric spark, may contract to 92 volumes but never to much less. Hence ozone is denser than oxygen. Furthermore, mercury, introduced into this ozonized oxygen, absorbed ozone, but still left 92 volumes of common oxygen. By heating the ozonized oxygen the 100 volumes were again obtained the ozone being destroyed by heat.

Dr. Odling, starting from the theory that free oxygen consists of two atoms, suggested that these phenomena might be accounted for on the hypothesis that an additional atom of oxygen might be condensed into each molecule, so that the formula for ozone would be O_3 and its density one-half greater than that of oxygen. When 100 volumes of oxygen were reduced by ozonization to 92, it might be inferred that 8 volumes of oxygen combined with 16 volumes, and that these 24 volumes were condensed to 16. In this way 8 volumes would seem to disappear. The absorption by mercury might only be the removal of the third atom, or the 8 volumes, so that 92 volumes of common oxygen would remain.

These views have received recently confirmation from the experimental researches of a French chemist, M. Soret. This gentlemen has succeeded in finding, in oil of turpentine, a substance which takes up the whole of the ozone, instead of removing only its third atom. Thus when 92 volumes of ozonized oxygen are mixed with oil of turpentine, a dark white cloud appears; the ozone vanishes, and 76 volumes of common oxygen remains.

Restoration of Patients Under the Influence of Chloroform.—In a paper read before the British Association, Dr. Richardson stated that the best method to restore a patient about to die from chloroform, was to introduce into the lungs by means of artificial respiration, air heated to 130° F. A bellows connected with a thin coiled tube of platinum, which could be raised to the necessary temperature by a spirit lamp, is the apparatus suggested. The air need only be forced through one nostril.

Cafeine an Antidote to Opium.—Dr. Henry F. Campbell of Augusta, Georgia, has been experimenting upon cafeine as an

antidote to opium, or rather as means of relieving the coma consequent upon the poisonous action of the drug. Dr. C. has published one case of recovery; he now gives us another case, in which, though he failed to restore the patient, he nevertheless produced such effects as to strengthen his confidence in the value of the antidote.

A Jew had swallowed nearly three ounces of laudanum and had been under its influence for fifteen hours. When seen he was blue, with feeble pulse, 100 to the minute, and breathing at the rate of four to the minute. The muscular system was completely relaxed. The treatment consisted mainly of ice to the head and the injection of twenty-five grains of cafeine into the rectum. Under this treatment, the skin resumed its natural tint, tone returned to the muscles, the respiration rose to twenty in the minute, and the man appeared to die from an accumulation of mucus in the bronchi and larynx, the result of previous engorgement. Such effects should certainly lead to further trial of this antidote.

Malformation of the Heart.—A curious case of malformation of the heart is recorded in the *Medical Times and Gazette* by Mr. Iliffe of Birmingham. A child of four months had been suffering from great dyspnœa accompanied by extreme lividity of the surface. Open foramen ovale was diagnosticated. Upon post-mortem examination, the diagnosis was verified and there was also a small oval aperture of communication between the ventricles. The most remarkable point however was the entire absence of the tricuspid orifice, so that the right ventricle could only get its blood through the abnormal opening between the two ventricles.

New Microscopic Reagent.—Dr. Schultze, of Rostock, recommends a solution of one part of bichloride of palladium in 800 of water, feebly acidulated with hydrochlore acid, which hardens tissue and facilitates the making of sections. By its use connective tissue remains uncoloured, hyaline membranes assume a light yellow, cell-formations a darker yellow and nerve marrow a greyish black. The fact that unstriped muscular fibre is colored yellow by this reagent, is important, as thereby it is readily distinguished from connective tissue.

Poison of Syphilis and Gonorrhœa.—Prof. Salisbury, to whose researches on malarious disease we have already alluded, published in the *American Journal of Medical Sciences* for January, a paper on the poison of these two diseases, in which he maintains that they are caused by the presence of plants of low organization. In the case of syphilis, this algoid vegetation invades the tissues, and finds its way into the blood, while the gonorrhœal plant confines itself to the epithelium. Hence, the writer thinks, the constitutional character of the former disease is accounted for. Figures of these plants, which are extremely minute, are given, but the author strangely neglects to say anything about their size, or to give the microscopic powers used in the observation. He calls the new plants *Crypta syphilitica* and *C. gonorrhœa* (probably *gonorrhœae* or *gonorrhealis* is intended.)

Animal Electricity.—M. Schultz Shultsenstein has lately published his investigation of the relation of electricity to muscular action. His novel and startling conclusions have been thus formulated:

1. The supposition that living muscle produces electricity is incorrect. If needles be plunged into the foot of a living animal and be placed in connection with a galvanometer, no deflection of the galvanometer needle occurs.
2. Muscles removed from the body give evidence of electricity, but this is because of the combination of the decomposing tissue with the oxygen of the air.
3. Salt water causes the galvanometer needle to be deflected. This explains why salted meat gives evidence of electricity.
4. The supposed electric current in the human muscle is solely caused by the salt water in contact with the tissue.
5. In diseased structures the electric current is derived from the decomposing tissues.
6. The electricity of the secretions is also derived from the decomposing tissues.
7. Animal electricity is an illusion.

The author has requested the French Academy of Sciences to appoint a commission to witness and report on the experiments upon which his conclusions are based.

Mutability of Species.—In a recent communication to the Geological Society of Paris, M. A. Gaudry pointed to some striking facts favorable to the theory of the mutability of the species. The sand pits in the environs of Paris, and indeed all drift deposits in general, are very rich in remains of the mammoth or primitive elephant, and of the *elephas antiquus*. These remains chiefly consist of molar or back teeth, in which characteristic differences may be easily recognized. They consequently pertain to two different species, and in order to ascertain whether there exists any close parentage between them, M. Gaudry goes back to the pleistocene period, which lies between the upper tertiary or pliocene, and the drift strata. Now the pleistocene forest-bed of Norfolk, contains a quantity of molars of each of the above species, but it also comprises others slightly differing from both, and also intermediate between those of *elephas antiquus* and *elephas meridionalis*, the latter ceasing to exist when the former and the mammoth begin. These again disappear after the drift, and are followed by other species. Here then we perceive a succession of species, each of which have sprung from the preceding one. During the tertiary period there existed a breed of horses to which palcontologists have given the name of *hipparion;* they had small lateral fingers, thus forming a link between pachydermata and solipedes, which latter was considered perfectly distinct so long as the genus *equus* was characterized by a single finger at each foot. Now, Mr. Owen, on examining the horses' teeth found in the cavern of Oreston, discovered that the *equus plicidens* to which they belonged was intermediate between the hipyarion and the present horse. In the *equus plicidens* the enamel of the teeth presents more folds than in the living breed but in the molars found in our gravel pits, M. Gaudry has perceived gradations between those presenting many and those presenting fewer folds, whence he concludes that our horse is a descendant of the *equus plicidens*. A hippopotamus, the remains of which were discovered at Grenelle a few years ago, appears not to differ materially from the race that now inhabits the rivers of Africa; and yet at the time the owner of these venerable relics was disporting himself in the Seine, the climate was much colder here than it is now; so that Mr. Gaudry concludes with great plausibility that, if we had the whole skeleton, some differences would probably appear.

Compression as a Treatment for Inflammation.—Beyond its long-established use as a method of treating aneurism, the compression of arterial trunks has lately been considerably employed as a therapeutical resource in the treatment of arthritic inflammations and similar diseases. Vanzetti of Padua (who, we think was the original proposer of this plan of treatment, since adopted in various countries) lately related to the Paris Academy of Medicine some cases of inflammation in which this procedure had been used. The first case was a wound of the hand, attended with excessive inflammation and swelling of the arm, its size being doubled. After twenty-four hours' digital compression of the brachial artery, the limb had returned to its normal size and all the symptoms had been relieved. The cure was complete in two days. The second case was one of malignant pustule upon the fore-arm. The cure of the patient was complete in a month. The third case was of elephantiasis of the leg. Compression of the femoral was kept up at intervals for about two months, when the patient left the hospital considerably improved. Three years after, the patient was seen, and the hypertrophy had entirely disappeared.—*Med. Gazette.*

Wounds Produced by the Chassepot Projectiles—Dr. SARAZIN, of Strasburg, has made some experiments on a corpse at close quarters, with the following results: 1st. The diameter of the orifice made by the bullet entering the body, is not sensibly larger than that of the projectile. 2d. The diameter of the orifice by which the bullet leaves the body, is from seven to thirteen times larger than that of the projectile. 3d. The arteries and veins are cut transversely, retracted and gaping; the muscles torn and reduced to a pulp. 4th. The bones are smashed in a manner out of all proportion with the dimensions of the projectile. To sum up, the wounding effects present a remarkable intensity, and it is well to note that the balls, after passing through the body, pierced two one-inch planks and buried themselves deeply in the wall behind.—*Med. and Surg. Reporter.*

Absorption of Gases by Solids.—Among the interesting observations of Mr. Graham, Master of the British Mint, upon the passage of liquids and gasses through solids, is the fact that at-

mospheric air, by passing through india-rubber, becomes super-oxygenated, and will rekindle smoldering wood like pure oxygen. Any kind of light india-rubber receiver, in which a vacum may be obtained, the size being sustained by mechanical means, will collect super-oxygenated air; the better if the india-rubber be thin and the temperature high. Mr. Graham makes the suggestion that the solid films pass gases through them by first condensing them to a liquid form within the substance, and then passing them off on the other side by evaporation. Hydrogen passes through red-hot platinum, while oxygen and nitrogen do not, or not in appreciable quantities; hence their compounds with hydrogen are readly dialysed by this method. The passage of carbonic acid, chlorine, hydro-chloric acid, vapor of water, ammonia, coal gas, and hydro-sulphuric acid, is also inappreciable, while the hydrogen, in compounds containing it, passes. One volume of red hot platinum absorbed 0.207 volume of hydrogen, retained it while cold, and gave it off on reheating. One volume of palladium absorbed 643 volumes of hydrogen, sensibly increasing its weight, and when heated afterward, gave off the most or it in a continuous stream. On the other hand, osmium-iridium does not absorb hydrogen, and copper absorbs it very slightly. Gold absorbs hydrogen and nitrogen slightly. Silver absorbs 0.289 of its volume of hydrogen, and then presents a beautifully frosted appearance. Oxygen is taken up in the proportion of 0.745. Red-hot iron and steel pass hydrogen as readily as platinum does.

Oxygen in the Market.—A company has been formed in Paris under the style of Jos. de Susini & Co., for the manufacture and sale of oxygen to be mixed with ordinary illuminating gases. The calculation is that an addition of one-third oxygen will be equivalent to multiplying a given quantity of illuminating gas eight times, the price of oxygen being fixed at only 2½ times that of ordinary gas. The superoxygenated gas will be used in lighting the International Lecture-room of the Exposition.

Disease Produced by Sleeping Together. During the night there is considerable exhalation from our bodies, and at the same time we absorb a large quantity of the vapors of the surrounding air.

Two healthy young children sleeping together will mutually give and receive healthy exhalations; but an old, weak person near a child will, in exchange for health, only return weakness. A sick mother near her daughter communicates sickly emanations to her; if the mother has a cough of long duration, the daughter will at some time also cough and suffer by it; if the mother has pulmonary consumption, it will be ultimately communicated to her child. It is known that the bed of a consumptive is a powerful and sure source of contagion, as well for men as for women, and the more so for young persons. Parents and friends ought to oppose as much as in their power the sleeping together of old and young persons, of the sick and of the healthy. Another reason ought to forbid every mother or nurse keeping small children with them in bed; notwithstanding the advice of prudence, no year passes that we do not hear of a new involuntary infanticide. A baby full of life, health and vigor in the evening is found dead the next morning, suffocated by its parents or nurse.—*Exchange.*—*St. Louis Med. Reporter.*

Re-vaccination; value of the Scar left by the first Vaccination as an Indication of its Protective Influence.—We find the following interesting and important statistics in the Report of Drs. Seaton and Buchanan on the State of Public Vaccination in London, and on the recent Epidemic of Smallpox, appended to the Sixth Report of the Medical Officer of the Privy Council for 1863.

"In the course of our school inquiry, we obtained facts that corroborate in the strongest way the law of connection between deficient vacine scars and post-vaccinal smallpox. By showing how much smallpox has prevailed in the vaccinated children, the facts we are going to cite would be of themselves a sufficient condemnation of much of London vaccination. We found 88 children scarred by smallpox out of the 49,570 school children who bore vaccine scars. This is at the rate of 1.78 per 1000 of the vaccinated children. Excluding the infant schools, and looking only to those children whose ages have given them longer exposure to smallpox, it was found (1), with respect to the quality of the vaccine scar, that out of each thousand children with typical scars, 1.22 were pitted by smallpox; out of a thou-

sand with tolerable scars, 2.35 were pitted by smallpox; and out of a thousand with bad marks, 7.60 were pitted by smallpox. (2.) As for the protective influence of the quantity of vaccination in the individual, it was further ascertained that of those children who had 4 scars (whatever their quality,) 0.67 only per thousond were pitted by smallpox; of those who had 3 scars, 1.42 in the thousand were pitted; of children with 2 marks, 2.49 in the thousand were scarred by smallpox: while those children who had only one vaccination mark were scarred with smallpox at the rate of 6.80 in the thousand. At the one extreme of goodness, with 4 more typical scars, only 0.62 per thousand children were scarred by smallpox, while at the other extreme of badness, with one bad scar only, 19.0 per thousand were scarred by smallpox. The best vaccination, therefore, was more than 30 times as protective as the worst."—*Boston Medical and Surgical Journal.*

Weight of the Human Brain—In the *Archiv fur Anthropologie*, Dr. A. WEISBACK has been giving several articles on the relative weight of the brains of the populations of the Austrian empire, in respect to the bodily size, age, sex, and disease. Some of his conclusions are as follows:

"Among Germans 20 years of age, those of medium height have the largest brains.

"With increasing size the cerebellum increases, while the cerebrum relatively decreases.

"In chronic sickness the total weight of the brain decreases but the decrease is confined to the cerebrum and the pons, the cerebellum relatively increasing.

"The total weight of the brain, and the actual weight of the cerebrum are greatest at about the age of thirty, from which period both steadily decrease until at the age of 80, ten per cent. is lost.

"The pons varolii increases to the fiftieth year, and then steadily decreases, sometimes 17 per cent. in a decade.

"On the whole the female brain is smaller than the male, but in certain races this difference is confined to the posterior, in others to the anterior segment.—*Med. and Surg. Reporter.*

BIBLIOGRAPHICAL NOTICE.

THE NEW ECLECTIC, *A Monthly Magazine of Select Literature.*—New York and Baltimore: Lawrence Turnbull and Fridge Murdoch.

We have received the first and second numbers of this new candidate for public favor. It is a substantial octavo, issued monthly, handsomely printed and well gotten up in every particular. Four numbers make a volume of over five hundred pages, making three volumes a year. The selections are made from a wide range of English Literature and evince no little taste and judgment. We heartily commend it to those of our readers who desire to keep up with the current literature of the day.

EDITORIAL DEPARTMENT.

Interesting to Dentists. In the December number of the *Dental Register* we find the following which will prove interesting to our readers:

"*Legal Contest with the Dentists.*—A motion was made in the United States District Court in the cases of Goodyear *et al.* vs. Taft, Berry, Smith, and seven others, for a preliminary injunction, based upon the late decision of Judge Nelson in the Vulcanite case. The defendants replied that they had abandoned the Goodyear compound, and were now using a rubber prepared by the Porter Manufacturing Company, under the patent granted to Edward L. Simpson, October 16, 1866. Affidavits were filed to prove that this compound contained only two and a half ounces of sulphur to a pound of rubber; the minimum fixed by the Goodyear patent being four ounces. Upon the day appointed for a hearing, both parties appearing, the complainant's counsel withdrew his motion, and abandoned the application for an injunction in all the cases."

Drs. A. Berry and H. R. Smith speak very favorably of Hale's rubber under the Simpson patent. Dr. Berry says he has used all the different preparations of dental rubber, and that after six weeks exclusive use of the "Improved Dental Rubber" manufactured by A. R. Hale, under Simpson's patent, issued Oct. 16th, 1866, he prefers it to any he has seen.

He also remarks that "the Simpson rubber requires more heat or longer time than the Goodyear for vulcanizing. If the "Directions for Steaming" accompanying the Simpson gum are followed, it is of a lighter shade of color than if steamed a shorter time; but as I regard this of little importance, I run up the mercury to 330 or 335, and steam from fifty to fifty-five minutes. Of course the necessary time may differ in different vulcanizers according as they differ in preventing escape of steam."

Dr. Smith speaks of this rubber as follows:—"Feeling it a duty for all members of the profession to call attention to improvements in Dental

work, I would say that I have been using the rubber made by A. R. Hale, under the Simpson patent, and find it equal to the best and superior to most of the rubber used for Dental purposes; and would advise all Dentists to give it a trial, and think they will be highly pleased with it."

Prof. Storer's Lectures.—We call attention to the advertisement of Prof. Horatio R. Storer of Boston, who delivers his third private course of twelve lectures, at his rooms in that city, during the first fortnight in June. No man is better able to deliver an instructive and interesting series of lectures than Dr. Storer, and we hope that his efforts to cultivate a more intimate knowledge of this important speciality of medicine will be appreciated by the profession, and rewarded by the presence of a large class.

Iodine Preparations for Dental Use.—The good effects which have attended the use of Iodine and its combinations, as dental medicines, have been so great that they are now generally used in the place of some of the less effective remedies upon which the profession relied, with varying success, for many years. For local applications in alveolar abscess, alveolar periostitis, absorption of alveolar processes, &c., the following preparations are now used: Tincture of Iodine, Colorless tincture of Iodine, Tincture of Iodine and Creosote, Carbolate of Iodine.

We have lately received from Dr. S. S. White a very excellent combination of Iodine and Carbolic acid, (Carbolate of Iodine), an account of which appeared in the Decem. No. of *Am. Journal of Dental Science.* We have also received from Dr. White a preparation consisting of Elixir of Vitriol and Tamnin, for use as an astringent and hæmostatic.

Spontaneous Generation.—Some months since we gave an account of the state of the controversy on this subject. It will be remembered that the distinguished microscopist, M. Donne, had gone over to the ranks of the spontaneous generationists, resting his convictions upon the results of certain experiments on eggs which he regarded as conclusive. We have now to announce that he has revised these experiments and has abandoned his new allies. He has been unable by the highest powers of his mimicroscope, to detect the smallest living organism in his prepared eggs. This greatly weakens the advocates of spontaneous generation, as his was the most distinguished name they could count on their lists. As we said before, the theory in question is contrary to the analogy of nature. It would require an overwhelming mass of proof to support it, and until that shall be brought to bear upon it, the scientific world will be slow to adopt the hypothesis.

Naevus Maternus, Mother's mark.—A mark or spot on the skin of children when born, presenting a variety of appearances and attributed to the influence of the maternal imagination.

Thomas Smith F.R.C.S., of St. Bartholomew's Hospital, London, in *Clinical Papers on the Surgery of Childhood*, says that "there are many well authenticated cases where marks and even bodily deformities in the fœtus can be fairly attributed to strong and persistent mental impressions in the mother;" and describes the following striking case of a child admitted into St. Bartholomew's Hospital in 1865. "She was at that time twelve years old. The left upper extremity and the greater part of the corresponding side of the trunk and neck were deeply stained with dark-brown pigment, from which grew an abundant crop of brown, harsh, lank hair, varying in length from one to two inches. The skin was rough and harsh; the arm was long, thin and withered; the scapula was unnaturally prominent. In fact the upper limb, shoulder, and back bore a very strong resemblance to the corresponding part of a monkey. The mother stated that when she was three months pregnant with the child, she was much terrified by a monkey attached to a street organ, which jumped on her back as she was passing by."

The same writer speaking of the treatment necessary for the removal of moles says that the only plan is by complete removal either with the knife or by some kind of cautery. As a caustic, he recommends the strong nitric acid as the most manageable and efficient means of cure, and the only one that has given him the best results. He also remarks that he need scarcely say that in infants the only moles that require treatment are such as by their size or position are manifest blemishes.

New Projectile.—The rapid advance of the military nations in the improvement of fire-arms, has led to improved forms of projectiles. It has been discovered, as might have been anticipated, that a rapidly travelling missile is apt at a certain distance, to make a clean cut through the soft parts. The old writers on military surgery tell us that the aperture of exit is always greater than that of entrance. However true this may be of the round ball, it is not invariably true of the conical bullet. The irregularity of the wound made by the modern missile appears to depend very greatly upon the amount of shattering it has undergone. Driven at high velocity at short range, say one hundred yards, and penetrating an object which offers considerable resistance, its form will be greatly changed and its track very irregular and jagged. At a lower velocity, it will penetrate deeper, come out comparatively unaltered, and leave a clear entrance wound. As a rule, the recent wars have given us wounds with clearly cut apertures of entrance and exit.

The Indian tiger-hunters, recognizing this fact, have begun to return to the round bullet as inflicting a more violent wound. Some of them have adopted a short conical bullet with a metallic case charged with percussion powder, inserted into its centre. There is small chance of the tiger continuing his charge when he receives such a missile as this. The explosion of the shell drives the fragments in all directions through the tissues, tearing up the muscles, pulverizing the bones, and producing ter-

rifle nervous shock, while the great volume of gas developed by the explosion greatly increases the disorganization. This murderous missile Herr von Dreyse is said to have introduced into the Prussian army, having adapted it to the needle-gun.

The Chassepot bullet, though constructed on a different principle, is claimed to be nearly as effective. This projectile contains a cylindrical cavity extending from the summit of the cone to about two-thirds the length of the ball, and having its inner orifice closed with a plug of boxwood or even beeswax. When the bullet strikes fair upon the head the plug is driven in, forcing the contained air out in all directions, and spattering out the bullet in a very remarkable manner, even to the extent sometimes of driving out its whole base. Of course the laceration is very great.

The savage ingenuity displayed in the construction of these formidable implements of war does not speak much for the persuasive powers of the Peace Society. Surgery, too, in its military department is becoming a much more difficult art, in consequence of the increased destructiveness of fire-arms.

Change of Programme.—The Goodyear Dental Vulcanite Company have notified the profession that all licenses expired on the first of January, 1868, and that they have decided, for the present year, to issue yearly office rights for certain sums, provided all previous dues are paid. So that instead of compelling Dentists to keep a special record and make quarterly returns, a certain sum is charged for a yearly office right, the company specifying the amount in each case, and increasing it according to their pleasure at the end of each year. They also threaten every practitioner with an injunction debarring him from all use of rubber, in case he refuses to comply with these terms. We refer our readers to the article *Interesting to Dentists*, in the present number of the Journal, and they can then decide with regard to the course they will pursue.

Rubber without Sulphur.—Our attention has recently been called to a new preparation of dental rubber which is said to harden by the escape of the fumes of the bromine and iodine with which it is mixed. No sulphur is used in its preparation; it is not hardened by steam, but by dry heat, and its proprietors assert that it is far purer than the vulcanite and has neither taste nor smell, and does not change color during the hardening process.

Not having obtained as yet a sample of this new preparation, we are not able to judge of its merits. It is known by the name of Dried or Iodized Rubber.

Typographical Error.—The word "of" in second line from end of Editorial on *American Academy of Dental Science* in January No. of Journal is superfluous.

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ORIGINAL COMMUNICATIONS.

ARTICLE I.

The Anatomy of the Cranium and Face.

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THERE is pèrhaps no portion of human anatomy of greater interest, and especially to the dental student, than that which relates to the *cranium* and *face*. The first as the protecting envelope of that wondrous organ of intellect, about whose delicate convolutions there yet remains so much of mystery; and the second, as comprising in its osteological architecture the orifices for the lodgement of the organs of the senses, which, surrounded by a movable mask of muscles, possessed of varied offices, constitute by their configurations and proportions, what we ordinarily denominate the *features*.

The bony and muscular developements of the face, together with the skin and fatty tissue, comprise in their variations, some of the striking characters by which we learn to recognize the sex, the age, and the different races of mankind, as well as in individuals, the moral, physical and intellectual traits.

For example—the marked delicacy of feature, and greater abundance of cellular and adipose tissues, indicate at a glance the *female* face. Again, the well known peculiarities in the distribution of the bones, particularly in the absence of teeth, the redundance of fat, and the slight muscular developement, in the plump and inexpressive face of *infancy*—whilst in the *aged* we have the reverse of this, the furrowed features and the pinched expression occasioned by the deficiency of fat, and the prominence of firm and rigid muscles.

And as time writes unerringly his wrinkle on the brow, so, no less surely do the traits of character stamp their impress on the face, which indeed might well be termed the "mirror of the soul."

Most of the superficial muscles of the head and face, differ in several particulars from those of other regions; they are destitute of that dense fascia which constitutes so uniform a covering to other muscles; and with a few exceptions, there is no tendinous structure entering into their formation. They lie closely attached to the skin, and their fibres are delicate and pale, so that their dissection is often tedious, and to the inexperienced, one of considerable difficulty. Regarding their function, these muscles are in part both voluntary and involuntary, and therefore come under the class of such as are termed mixed muscles.

Opposite the orbitary and buccal cavities of the skull, the skin presents transverse eliptical openings, which under the influence of will, may be tightly closed, or widely opened; each of these cavities is surrounded by a particular orbicular muscle, which, by its contraction, closes the orifice that it encircles; but here its capacity ends, and the office of opening or dilating the orifice belongs to other muscles, which radiate as it were from these sphincters, their outer extremities being inserted into adjacent osseous surfaces, from which positions they are enabled to perform the double motions which dilate the orifices, and expand the features generally.

The first of the orbicular muscles to be considered is the *orbicularis palpebrarum*, or *orbicularis oculi* as it is sometimes termed. This is a thin membranous muscle, situated immediately beneath the skin, in front of the orbit, and around the edge of which it extends considerably in all directions, except inwards, it is therefore somewhat oval in shape, and is depressed in the centre, that it may conform in its configuration to the globe of the eye. It has dividing it, the horizontal cleft we have above referred to, and is formed of concentric circles around this opening. There are several origins to this muscle, the first, from the upper end of the nasal process of the superior maxillary bone, the next from the adjacent internal angular process of the frontal bone, and the last from the upper margin of the palpebral ligament. This ligament, called also the *tendo* oculi, is nearly a fourth of an inch long, attached internally to the upper border of the nasal process of the superior maxillary, and passing outwards and backwards, to the internal commissure of the lids, divides into two slips, between which lies the caruncula lachrymalis, and are inserted each into the tarsal cartilage, and the lachrymal duct. From these three origins that we have given, the orbicularis palpebrarum forming a broad fasciculus of fibres, passes over the superior tarsal cartilage and outwards, to the external angle of the eye, then curving inwards, cover the lower tarsus, terminating at the inner canthus, where it is inserted into the margin of the orbital process of the superior maxillary bone, also its nasal process, and the inferior margin of the palpebral ligament. The external fibres of this muscle are strong and red, while those that are within, lying upon the eye lids, are thin, scattered and pale.

Regarded physiologically, the orbicularis palpebrarum differs from all the voluntary muscles; its mechanism is very plain, and its office is simply to protect the eye, this it accomplishes in several ways. A slight contraction of the muscle closes the eyelids, a more powerful contraction draws along with it the adjacent radiating muscles, causing

the depression of the brows, and the ascent of the cheeks, giving the whole face a puckered appearance; it is the external, stronger and more voluntary fibres that act in this way and it is they that are chiefly used in knitting the brows, and drawing them down to shade the eyes. The voluntary and involuntary character of this muscle, is founded no less in anatomy than in physiology, so that it might indeed be considered as two muscles.

The simple occlusion of the eyelids, which we call *winking* is performed by the contraction of the inner and more delicate palpebral portion of the muscle, especially the superior. Regarding its nervous excitability, and the operation of its functions in the opposite conditions of *sleeping* and *waking*, the workings of this muscle are of particular interest. Whilst awake, the ciliary portion of the orbicular muscle is ordinarily relaxed, still it is under the command of the will, though it remains to a remarkable degree under the influence of the organic instinct that prompts to self preservation; for instance, at intervals the eye lids rapidly close, and are as instantaneously reopened, for the purpose of lubricating the ball of the eye; and whenever that delicate organ is threatened with the contact of a foreign body, it contracts in advance of, or in spite of the will. When sleep approaches, the contraction of this muscle closes the eye-lids, and so long as sleep continues, it remains contracted, whilst all other muscles of the body, are in a state of relaxation, and it only relaxes again at the moment of awaking. Another interesting fact regarding the function of the muscle, is, that if a bright light suddenly falls upon the countenance of the sleeper, the outer fibres will also be instantaneously contracted, so as to give additional shading and protection to the eye.

In sleep the eye is covered principally by the descent of the upper palpebra, hence the "equator oculi" in real sleep, is below the median line, such is not the case when sleep is feigned.

Another muscle, lying immediately beneath this last

mentioned, though quite small requires a passing remark, as a participant in the functions of the orbicularis; it is the *corrugator supercilii*—a short though somewhat thick muscle, arising from the inner part of the nasal protuberance, its fibres, of a conical form, run upwards and outwards, and blend with the deeper portions of the orbicularis palpebrarum opposite the middle of the brow, which it draws downwards and upwards, knitting it as it were, and wrinkling the forehead vertically, thus contributing to the expression of ill-temper or discontent.

The second sphincter muscle, the *orbicularis oris* is of no less interest than the first; situated between the skin and mucuous membrane, it is of considerable thickness, and encircling the mouth, is of transversely oval form, composed of two semi-elliptical halves, separated by the cleft of the mouth, beyond the commissures of which the fibres from the upper and lower portions blend, and encroach upon the cheeks. Unlike any of the other face muscles, the orbicularis oris has no bony connections, and is literally suspended amid the muscles that radiate towards it.

When the mouth is closed, the fibres of this muscle mutually converge, and are therefore puckered in the line of their direction; their relaxation passively permits the expansion of the lips. The fibres directly adjacent to the edge of the mouth, form a particular investing fasciculus, which is turned back, or folded outwards, and it is the development of these fibres which produces that marked eversion of the lips characteristic of the negro race. Like the sphincters generally, the chief action of this muscle is to contract from its circumferance towards its centre, but it is distinguished from these by the very remarkable power, peculiar to it alone, of contracting in isolate portions, one lip, or one angle of the muscle may act independently, and even one side of the lip may move, the rest remaining quiescent; thus aided by other muscles, this capacity enables it to participate in the play of numberless expressions of the face.

In reviewing those muscles which surround the orbicular muscles that we have just considered, we have first to notice the *occipito frontalis*, a thin, though broad and rather extensive muscle digastric or rather quadriceps, situated on the upper part of the cranium, which it closely envelops from the two superior curved lines of the occipital bone, to the supra-orbital arches of the frontal bone. It is composed of two distinct muscular bellies, united by an epicranial aponeurosis, and hence by some anatomists has been regarded as two different muscles. It is with the anterior or frontal portion that we have most to do, as connected with the obicularis palpebrarum. It is irregularly quadrilateral in form, and its fleshy fibres proceeding from the epicranial aponeurosis over the coronal suture, descend parallel with one another, towards the eye-brows, where they intermingle with those of the orbicularis; a few fibres of the inner portion being continuous over the nasal bones, constitute a little muscle called the *pyramidalis nasi*. The occipito frontalis is very closely adherent to the scalp, and but loosely attached to the cranium, over which it moves easily and to a considerable extent, thus forming a wise provision of nature for the protection of the integument, which with the scalp, will yield gradually before any weight or pressure against the head, rather than be lacerated by it.

Its office is to elevate the integuments of the forehead into transverse wrinkles, raise the eye-brows and cause them slightly to diverge, making tense the skin of the upper lids, and thus exposing the eye-ball as in the act of staring. If the anterior portion be fixed, then the action of the muscle is to draw the scalp downwards and forwards.

The use of the *pyramidalis nasi* is much the same, it is inserted into the compressor nasi muscle as it spreads over the nose, and by its contraction elevates the integuments of this region of the face, though to a very slight degree, its chief office being, to serve as a fixed point to the frontalis.

The muscles next concerned to a considerable extent in the play of expression, are those thin delicate fleshy ribbons situated between the orbicular muscles of the eye and mouth; and first, the *levator labii superioris alæque nasi*, whose name much larger than itself would prove not a little inconvenient, did it not so clearly indicate its location and its use. Then, as we have said shaped like an acute angled triangle, this muscle is placed obliquely on either side of the nose, arising by a tapering summit from the nasal process of the superior maxillary bone, it descends obliquely outwards, and becoming broader, its inner edge is attached to the cartilage of the ala nasi, and also to the integument; whilst the outer portion expands into superficial fibres, which are attached to the skin of the upper lip, and into deeper fibres, which blend with those of the levator labii proprius and orbicularis oris. By its name and attachments, the action of this muscle is easily understood, as an elevator of the alæ of the nose and the upper lip, giving to the face that characteristic expression which has entitled it the *muscle* of *disdain*.

Immediately outside and parallel with the last mentioned, is the *levator proprius labii superioris;* this is irregularly rectangular, and like its neighbor is thin and ribbon like, extending over the middle part of the face, it is attached above by a few small aponeurotic fasciculi to that portion of the superior maxillary bone, and of the malar bone which forms the inferior edge of the base of the orbit, from this origin, its fibres converging slightly as they descend obliquely inwards, into the upper segment of the orbicularis oris, which it assists in elevating, at the same time drawing it slightly outwards.

Still external to the levator proprius, are two similar muscles passing diagonally over the cheek from without inwards, the first of these, the zygomaticus minor, arises from the upper part of the malar bone, and from within the circumferance of the orbicularis palpebrarum, and below, loses itself in the skin and the orbicularis oris,

thus we see that the thread like fibres of the zygomaticus minor directly connect the two orbicular muscles, aud excites them to simultaneous contraction; occasionally, this little muscle is wanting. Its fellow, however, the *zygomaticus major* is always present; and is considerably larger, being situated on the outside and a little under the minor, it runs in the same direction, to become blended with the outside of the commissure of the orbicularis oris, and also draws that muscle upwards and outwards.

The *caninus* or *levator anguli oris* is the last muscle that we shall notice as connected with the upper portion of the orbicular muscle of the mouth. Its name designates its origin in the middle of the canine fossa, and also indicates its office for it is inserted at the outer portion of the labial commissure, and besides elevating the angle of the mouth, also draws it slightly inwards, thus contributing to important modifications of feature.

We will now glance for a moment at the antagonists of these levator muscles; we find them in the *depressors* of the lip; and first at the *quadratus menti, or depressor labii inferioris*, this muscle is of rhomboidal form, its pale fibres proceed inferiorly from the inner half of the external oblique line of the inferior maxillary, and from the platysma myoid, of which indeed it is a continuation, for though there is an aponeurotic intersection which indicates the line of separation at the base of the jaw, between the two muscles, yet even this is traversed by a few muscular fibres, which establish the continuity of these muscles; the fibres running upwards, also converge, the deeper portions losing themselves in the deep part of the semi orbicular, the more superficial, passing in front of this muscle, are attached to the integument of the lower lip; the inner fibres at their upper part decussate with those of the opposite side; and this interlacing of its fibres enables it not only to draw its own side obliquely outwards, but also to pull upon the other half, so as to bring the whole of the lip towards itself. In the simultaneous action of the two

quadrati, the lower lip is stretched transversely, rather than depressed.

The last muscle that we shall consider, the *triangularis*, or *depressor anguli oris*, is situated subcutaneously at the outer side of the quadratus menti, it is a thin muscle and as its name indicates of triangular shape, directed vertically, and arises by a broad base, from the edge of the lower jaw, its converging fibres ascend towards the commissure of the lips. It is closely connected with the skin, and a few of its deep fibres mingle with the orbciularis, and superiorly even blends its fibres with the levator anguli oris, and zygomaticus major. In its action, it is therefore the antagonist of these muscles; they are also mutually opposed in the part they perform in the play of the features; for the triangularis gives expression to the sorrowful emotions, as the others are the agents of livelier feelings.

It would be impracticable in an article such as this, to refer to all the muscles of the face, which to a greater or less degree play their part in the anatomy of expression, we must therefore rest satisfied with this casual survey of those most prominent. As portrayers of the passions and emotions of the human heart, and as faithful indexes of the various traits of character, they are full of interest, for truly was it said that "the soul fashioneth for herself a habitation fit to dwell in."

ARTICLE II.

Saliva.

By Andrew S. Cutler, D.D.S.

This as a general term includes the secretions of the parotid, submaxillary, and sublingual glands. It is a transparent, viscid fluid, with but little taste or smell, when of a healthy recent condition. It is mixed also to a considerable extent with the mucus from the buccal, labial, and lingual glands. Its specific gravity accor-

ding to Dalton, is 1.005. Different examiners, however, give different results, and it is a well ascertained fact that different pathological conditions give different degrees of density. Hamburger found it 1.0167. Lehman makes it from 1.004 to 1.006, and Golding Bird states it at 1.0091. Dr. Samuel Wright of Edinburg, Scotland, who has made this subject one of deep study and research, and whose opinion is entitled to profound deference, in a series of experiments upon the same individual, finds it of a higher specific gravity after a meal, than before, and in the evening, than early in the day. A free use of animal food also increases its density, especially when such food is of a fatty nature. A vegetable diet seems to materially lessen its specific gravity, while alcoholic stimulants again increase it. Dr. Wright found a difference according to the different varieties of food used, of from 1.0039 to 1.0176. Like most fluids of an adhesive nature, it becomes frothy when agitated, owing to the admixture of atmospheric air. It undoubtedly has a great affinity for oxygen, absorbing it readily from the atmosphere, and giving it out again to other bodies, hence it is, that silver is liable to tarnish or oxidize if left in contact with it for any considerable length of time. But this, it seems, may also be owing to the traces of sulphur discoverable in mucus. In the preparation of mercurial ointment, it is a well known fact that the globules of mercury are more easily broken down if there be an admixture of saliva from the mouth. All oxidizable metals also, seem to be more easily acted upon by this fluid than by pure water. Normal, healthy, saliva, according to Wright, under ordinary circumstances, absorbs about its own volume of oxygen, though under abnormal conditions it may absorb from one-half this amount to nearly twice as much. This is undoubtedly owing in part to the difference in proportion of the carbonic acid gas contained in the secretion. When of a recent state, saliva is frothy, and opaline in appearance, and holds in suspension, minute, whitish flocculi.

If allowed to stand for a sufficient length of time in a cylindrical vessel, there appears an opaque whitish deposit collecting at the bottom, the fluid above becoming clear. A microscopic examination of this precipitate, reveals an abundance of epithelium scales, probably detached from the internal surface of the mouth by mechanical irritation. There is also a certain amount of granular matter and a few oil globules to be detected. The organic substance of saliva is known as *ptyaline*. A principle analogous to *diastase*, a nitrogenous product. Both of these substances have the peculiar property of turning starch into sugar, and thereby induce fermentation. Ptyaline is coagulable by alcohol, which phenomenon is brought about by the small percentage of albumen it contains. Sulphocyanogen may also be detected by a solution of the chloride of iron, producing the red color of sulphocyanide of iron. Saliva has usually a decided alkaline reaction, which may vary in intensity according to circumstances. The amount of fluid secreted within a given time is also exceedingly variable, and may result from a great complication of causes, amongst which are the amount of fluids taken within the system, the character of these fluids, the amount of solid food ingested, its consistency, its digestive properties, the amount of motion of the muscles of mastication, and the particular physiological or pathological condition of the subject. Mitscherlisch obtained from a patient having a salivary fistula in the duct of steno, about two and one-half ounces of fluid in twenty-four hours. He calculated that the entire amount secreted was about six times that of this single gland. According to which calculation the patient must have secreted some fifteen ounces in the course of a day. Valentine placed the amount per 24 hours, at from seven to about ten ounces, whilst Thompson made a normal secretive amount at only seven and six-tenths ounces troy. These estimates without doubt fall considerably below a correct average. Bidder and Schmidt make much higher calculations. One of these observers

in experimenting upon himself, without the use of any artificial stimula, and allowing seven hours for sleep, secreted nearly three and one-half pounds avoirdupois. Dalton under like conditions was able to collect about 556 grains of saliva per hour, and thinks that under ordinary circumstances the amount secreted may be rather less than three pounds avoirdupois per diem. But as before stated, owing to a great complication of causes, the normal flow of this peculiar fluid may very widely vary, it being necessary to take in consideration the size, sex, age, weight, food, drink, and particular pathological condition of the individual experimented on. In common with nitrogenous substances generally, saliva is susceptible to quick decomposition. This property is undoubtedly owing to the presence of its organic principle, ptyaline. When exposed to a temperature of 60° F. putrefaction may commence in four or five days, generating ammonia. About the year 1831, Leuchs of Germany, made known the remarkable fact, that if saliva were mixed with boiled starch in equal proportions, and kept for a short time at a temperature of 100° F. the latter was converted into sugar. According to Dr. Wright, it seems probable that the theory implied, was more or less understood for a long time prior to the experiments of that chemist. And though Mr. Leuchs has generally the credit of making the discovery, one thing is certain, the principle involved was certainly made use of many years before his time. The transformation of starch into sugar, is undoubtedly one of catalysis, or simple contact of the starch with the organic substance of the saliva. This peculiar phenomenon was for a long time supposed to constitute the physiological function of this secretion, viz. to effect the division and liquefaction of all starch principles. This property, however, seems an accidental one, for under the ordinary processes of digestion, the food does not remain for a sufficient length of time in contact with the fluids of the mouth, to be acted upon by them, for, passing almost directly into

the stomach, it becomes rapidly intermingled with the fluids of that organ, and when there, this peculiar chemical action of saliva upon all starch material, seems at least for the most part, at an end. For if starch, saliva, and gastric juice be mixed together in a test tube, no change, indicating the presence of sugar takes place. In fact, there seems to be an altogether distinct provision made for the digestion of this substance, entirely independent of the action of saliva. And that provision is met in the smaller intestines and their secretions. Here the conversion of the starch group into the saccharine fluid, seems rapid, effective, and complete. The action in this case being far more distinct and energetic, than in the case of saliva. Still, it seems probable that saliva may assist, to a greater or less degree, in the various nutritive and digestive processes. Liebig thought that one great function of this fluid was to convey atmospheric air, particularly its oxygen into the stomach and intestines. And when we consider that a certain amount of oxygen seems necessary in these organs, for the accomplishing of their particular physiological offices, the above hypothesis seems not wholly improbable. Still, there is little doubt at the present day but that the great function of saliva is chiefly physical in its nature. Yet notwithstanding this, it is none the less essential to the actual necessities of the system. By its action the food is moistened, the process of mastication facilitated, and the mass intermingled and enveloped by a glairy viscous fluid, necessary for its lubrication in its downward passage through the æsophagus. Were it not for this fluid of the mouth, all dry food would have to be moistened by some unnatural vehicle, and an inflamed condition of surrounding parts, would naturally result. In fact, all food, whether containing a greater or less amount of moisture, seems to require, at least to some extent, the presence of the combined salivary secretions. And the fact we believe seems well ascertained, that where this deficiency is noted, there is also an accompanying, unfavorable, pathological condition. Whether this con-

dition be the result of a general sympathy of parts, or of a direct action, or want of action of the substance in question, we will not undertake to determine. The chemical composition of saliva according to Bidder and Schmidt, is as follows:

Water	995.16
Organic matter or ptyaline	1.34
Sulphocyanide of potassium	.06
Phosphates of soda, lime and magnesia	.98
Chlorides of sodium and potassium	.84
Mixture of epithelium	1.62
	1000.00

The above proportions, however, may vary in different individuals, and to some extent, even under normal conditions of the same individual. Berzelius found a greater proportion of animal matter.

Water	992.9
Ptyaline	2.9
Mucus	1.4
Extract of flesh with alkaline lactates	.9
Chloride of Sodium	1.7
Soda	.2
	1000.0

Wright found a greater proportion of water than either of the foregoing. While Frerichs, quoted by Carpenter, the great English physiologist, effects a sort of compromise with the preceding tables. It is as follows:

Water	994.10
Ptyaline, with a little alcohol extract	1.41
Mucus and epithelium	2.13
Fatty matter	.07
Sulphocyanide of potassium	.10
Alkaline and earthy chlorides and phosphates with oxide of iron	2.19
	1000.00

We now come to a brief consideration of the individual secretions entering as components of this fluid. First in importance, and greatest in amount, is the secretion of the parotid glands. This fluid may be obtained in a pure state by inserting a silver canula of a diameter of from 1.25 to 1.20 of an inch, into the orifice of the duct of Steno. Human parotid saliva is colorless, perfectly clear, watery in consistency, and distinctly alkaline in reaction. When the jaws are in a state of rest its flow is scanty. But with the introduction of food into the mouth, in connection with the movements of the muscles of mastication, it is poured out in considerable quantity. Dalton obtained under favorable circumstances, from a single duct of a healthy man, 480 grains of parotid saliva in twenty minutes. This fluid was analyzed by Perkins, of the College of Physicians and Surgeons, of the city of New York. The following were the results:

Water	983.300
Organic matter precipitable by alcohol	7.352
Substances destructible by heat, not precipitable by alcohol	4.81
Sulphocyanide of sodium	.33
Phosphate of lime	.24
Chloride of potassium	.90
Chloride of sodium and carbonate of soda	3.06
	1000.00

Organic matter, or ptyaline seems to enter into a greater proportion here, than it does in the mixed saliva. The flow of this fluid presents one peculiarity in the fact that it is poured out most freely upon the particular side in which mastication is taking place at the time. The secretion of the sub-maxillary glands is less in quantity, and more difficult to obtain in a pure state than the parotid. Its specific gravity is rather less than that of the mixed secretions, nor is its alkaline reaction so decided.

While the amount of organic matter contained in it, is somewhat less than is to be found in either the combined or parotid fluids. There is, however, a noted increase in its viscidity. The characteristics of sublingual saliva are not so well understood as either the individual fluids before mentioned. They are, undoubtedly, however much the same as those of the submaxillary. There being, possibly, a still increased degree of viscidity, with a smaller proportion of organic elements.

ABNORMAL CONDITIONS OF SALIVA.

Of the chemico pathological conditions of combined saliva, we will devote only the briefest time and space. The following classification is adopted from Dr. Samuel Wright.

Deficient, Redundant, Fatty, Sweet, Albuminous, Bilious, Bloody, Acid, Alkaline, Calcareous, Saline, Puriform, Fetid, Acrid, Colored, Frothy, Gelatinous, and Milky.

Deficient Saliva. This variety arises from a cause purely physiological in its nature, and may be owing to peculiar nervous or emotional conditions. Or, it may arise from an obstruction of the salivary ducts, or an inactivity of the secreting glands. An obliteration of the passage leading from the glands, gives rise to the disease termed Ranula, which is merely a distension of the duct on account of the closure of its natural outlet. Besanez found an analysis of ranula fluid like the following.

Water	95.029
Traces of fat and chloride of sodium	1.062
Watery extractive matters	.923
Albuminate of soda	2.986
	100.000

Redundant Saliva. This variety may be either spontaneous and healthy, or excited, with a vitiated and altered condition of its constituents. The former is frequently, and the latter occasionally met with in young children

during the "teething period." Its specific gravity in such cases is lower than that found in the normal flow of the secretion being from 1.001 to 1.003 or 1.005. This super-abundance of saliva is often observable in extreme old age, and is frequently noticeable under many conditions of idiocy. The fluid is usually clear and transparent, without the usual blue tinge of the normal secretion. It is often deficient in albumen, with a corresponding small percentage of ptyaline and sulphocyanogen. From an examination of spontaneous salivation, Vogel makes the following table.

Water	991.2
Ptyaline, osmazone, fat and albumen	4.4
Salts of soda, potash and lime	4.4
	1000.0

Artificial ptyalism, or excessive discharge of saliva, is, in many parts of our country, the too common result of an injudicious or excessive use of mercurial preparations. It is also occasionally brought about by an undue use of the halogens, especially Iodine, Chlorine, and Bromine. Arsenic, Lead, and antimony frequently effect the same results. When ptyalism is produced by mercurial agency, the quantity of fluid discharged, its specific gravity, and chemical components are all liable to considerable variation. Lehmann thinks that in this condition of disease, the traces of the metal itself are clear and distinct. Other noted physiological chemists have never been able to detect its presence. The specific gravity of salivated fluid is much the same as in cases of spontaneous ptyalism. There may be, also, a noted excess of mucus, indicating a higher specific gravity, usually with a loss of its peculiar transparency, unless the mucus be in great excess, when the turbidity frequently vanishes. The alkaline reaction, too is unmistakeable and its property for absorbing oxygen

2

increased. There is often, also, an increased amount of ptyaline present, effecting an easy decomposition, and generating ammonia. If the excess of ptyaline be very noted, there is usually a deficiency of sulphocyanogen. In giving an analysis of mercurial ptyalism, we can probably do no better than quote the result of three analyses of the distinguished Dr. Wright.

	No. 1	No. 2	No. 3
Water	989.8	988.7	987.4
Ptyaline	1.7	1.9	2.7
Fatty acid	trace.	.4	.7
Albumen with soda and albuminate of soda	1.5	.6	1.3
Mucus with trace of ptyaline	2.1	3.8	3.5
Lactates. Muriates. Phosphates. { Potash. Soda. Lime. }	1.9	2.4	2.6
Hydrosulphocyanites	3.0	2.2	1.8
	1000.0	1000.0	1000.0

Fatty saliva. There may be, as has before been intimated, under normal conditions, a certain proportion of fatty matters in the saliva, where these are exhibited in undue amount, the peculiar condition under consideration is presented. Fatty saliva is characterized by a greasy taste and feeling in the mouth accompanied by a sticky, slimy sensation. Its specific gravity is often as great as 1.0113. Its color is a dull yellowish white, without the usual blue tinge of the healthy state. Its property of absorbing oxygen is limited, and its action upon starch, feeble, this substance being imperfectly converted into gum, with no traces of sugar. Wright made an analysis like the following.

Water	987.4
Ptyaline	.7
Fatty matter and acid	3.9
Albumen and soda with albuminate of soda	1.5
Sulphocyanide of potassium	trace.
Mucus	2.4
Lactates, muriates and phosphates of potash, soda and lime	1.8
Loss	2.3
	1000.0

The true organic principle is here notedly deficient, and, as is usual with many abnormal conditions of this secretion, the proportion of water is in much less than normal quantity.

Sweet Saliva. This is a result of various abnormal conditions of the system. A depraved digestion, being, perhaps a predominating cause. It can be distinguished by a sweet, and often sickish taste, with a color nearly white, lifeless and lustreless. It decomposes readily, forming, as might be expected, acetic acid. Its chief peculiarity consists in the presence of saccharine matter in combination with mucus. Wright finds a table of its chemical elements as follows.

Water	986.9
Ptyaline	.3
Fatty acid	.2
Muco saccharine matter	5.6
Albumen with soda and albuminate of soda	.4
Mucus with trace of ptyaline	2.6
Lactates, muriates and phosphates of soda potash and lime	1.9
Loss	2.1
	1000.0

Albuminous Saliva. Of this description there are two general varieties. The transparent, and the opaque. The former contains less ptyaline and more sulphocyanogen than the healthy secretion. Its specific gravity and alkalinity is also much increased. It is easily decomposed, and as is usual where there is organic matter in more than normal proportions, a larger percentage of ammonia is generated. Its action upon starch is not so definite as in the case of the natural secretion. The opaque variety has a high specific gravity, is milky in appearance, and when boiled coagulates in flakes. These, in time are precipitated, leaving above, a greenish, semi-transparent fluid. The chemical action of this variety is strongly alkaline, absorbing but little oxygen, and exhibiting but faint powers over starch substances. This condition of disease is often found in persons addicted to an excessive use of alcoholic drinks, and also to inordinate eaters. As might be supposed, Albuminous Saliva may be distinguished by the increased percentage of albumen it contains. Any proportion either way of .02 minimum, or 5 per cent maximum constitutes diseased action. Wright, in one case found it as high as 1.03.

Bilious Saliva. When the action of the liver is abnormal, and its peculiar secretion in excess, or the secreting surfaces disordered, the bile becomes absorbed by the system in general, giving to all the tissues that peculiar color and expression, of which the term, "bilious," is, perhaps, more expressive than any other. This characteristic extends to the saliva, as well as to the other constituents of the body. Bilious saliva may be either colored or not. The lighter shades of this abnormal condition of the secretions of the mouth are usually alkaline, while the darker varieties may be acid. Bilious saliva is characterized by a high specific gravity, and a maukish, bitter, offensive taste. Both colored and colorless varieties contain but remote traces of ptyaline and sulphocyanogen, while their property of converting starch

into sugar is almost entirely wanting. Their distinguishing peculiarity is owing to the presence of some 3.6 parts per 1000, of biliary matter and cholerestine.

Bloody Saliva. This variety may arise from different pathological causes. Hæmatin, the coloring principle of blood, giving the various degrees of shade, according to the amount of its presence, or the diseased action of parts with which it has come in contact. It has a high specific gravity, the usual percentage of sulphocyanogen, with a noted decrease however, in the presence of ptyaline. Oxygen is but slightly absorbed by it, and its digestive powers are small. By decomposition it becomes darker and darker, evolving ammonia.

Acid Saliva. It is this particular condition of the fluids of the mouth that has, perhaps, a more especial bearing upon the dental profession, than any of the others. The presence of the acids in the mouth, even when in a state of remote dilution, is productive, to a greater or less extent, of caries of the teeth, dissolving as they inevitably must, the calcarerous salts of these organs, rendering them porous and friable, and giving to them, also, an abnormal sensitiveness to every varying degree of heat and cold, and often even to touch itself. The peculiar sensation of "teeth upon edge," is undoubtedly due to the presence of acid in some form within the organic structures. This morbid state of the salivary secretions may be owing to different causes. Primarily and strictly local of which is a peculiarly abnormal condition of the glands themselves. Or, there may be, so to speak, an acid diathesis of the system generally, and this condition is really implied in different degrees in such diseases as rheumatism, gout, ague, various kinds of fever, and some particular functional disturbances of the stomach, and whenever, in fact, the saliva becomes acid to any considerable extent, this latter pathological state of the system is its sure accompaniment. The saliva, according to Wright, may be impregnated with lactic, acetic, muriatic, uric, or oxalic

acids. Each particular variety being indicative, as a general thing, of some diseased action of particular parts. Acidity of the saliva is sometimes so excessive as to corrode even the gums and lips, while its affinity for the mineral substances of the teeth is so great, and its action so rapid, as to cause a disintegration of their structure, leaving them sensibly rough both to touch and appearance. The chemical test for the presence of acid, is litmus paper, which is colored with an intensity in proportion to the presence of the acidifying principle. Acid saliva has nearly the same specific gravity as the normal secretion and also the usual percentage of organic matter, which often presents distinct whitish floculi, the result of the coagulation of albumen from the action of the contained acid.

Alkaline Saliva. This variety is dependent upon an ex-excess of some alkaline principle within the system. It is generally found in connection with neuralgic or nervous affections particularly upon the diseased side. It does not possess the ready action upon starch as does healthy saliva, and is susceptible to a more rapid decomposition. Litmus paper gives no notice of the presence of acid, as all such properties have been neutralized by an excess of alkali, while its taste is sometimes so excessively characteristic of the above principle, as to lead one to suppose that free soda had accidentally found its way into the mouth. The specific gravity of this description of saliva is usually low, and one of its peculiar features is, that soda is the sole alkaline principle, all other alkalies being excreted by other sources.

Calcareous Saliva. Owes its peculiarity to the presence of the phosphates and carbonates of lime, and it becomes a matter of considerable interest to the dental practitioner from the fact that from it, chiefly arise those calcareous deposits found upon the teeth and within the salivary ducts In one case Dr. Wright found as high as 1.4 per cent of phosphate of lime in the saliva, the normal propor-

tion being only about 16 parts per 1000. The other chemical elements may be in usual amount.

The remaining morbid conditions of saliva are either comparatively rare in occurrence, or unimportant in their nature. Their names are characteristics of their chemical or physical properties. Saline saliva implies the presence of a limited proportion of chloride of sodium. Puriform saliva always contains an admixture of pus, and characterizes the salivary fluids during the suppurative process of alveolar abscess and other diseased conditions of the gums. Its very nature implies an increased amount of albumen, and a noted susceptibility to decomposition. Fetid saliva generally considered, may owe its properties to the absorption by the saliva glands, of any nauseous or disagreeably scented substances taken within the system, and then giving out again their particular odor. A common and very disagreeable illustration of which is furnished by chewers of tobacco. Pathologically considered, however, fetid saliva is dependent upon morbid constitutional changes, which it is true, may to a greater or less extent be brought about by these same general or external causes. Acid saliva, without any essential changes of chemical ingredients or any discernable alteration of parts, may possess active chemical, or chemico-vital properties, materially differing from the healthy secretion. It is peculiarly manifest, when from an internal diseased origin, or external irritating cause, the normal action of the brain becomes excessive, and the animal or individual becomes so to speak infuriated. This property of saliva is noticable in hydrophobia, and also in many instances where animals are under the influence of uncontrollable frenzy. The foregoing morbid conditions of the salivary fluids, excepting, perhaps the last, are, it must be remembered, the results of diseased action, and not their primary cause. They may afford however, to the skilful pathologist, valuable indications of abnormal conditions of the system, whereby he may intelligently judge, or may be assisted

in judging, at least to some degree, of the proper methods of controlling disease. As a general rule, we find in all inflammatory diseases, a noted decrease of the watery proportion of saliva. Below is given a comparative table of the general constituents of the salivary secretions in an average of ten analyses, from patients suffering from inflammatory action, and also when in a state of health. It is from L'Heritier.

	In Inflammation.	In Health.
Water............	968.9	986.5
Organic Matter	30.0	12.6
Inorganic Matter	1.1	.9
	1000.0	1000.0

ARTICLE III.

Dental Progress. No. 5.

By Professor Austen.

A good "impression," the basis of a dental mechanism, is the resultant of (1) skill, applying a (2) good plastic material, by means of (3) a suitable vehicle. In considering these three, in connection with dental progress—we have already shown the advantages possessed by the operator of the present day, in respect of the last; and we propose, in this paper, to show the same, in respect of the second. But in the first we can claim no progress.

The dentist of to-day is not a whit more skilful than the dentist of the last century—taking a fair representative from each age. The piece before me, made by Hudson, shows evidence of a skill equal to that displayed by a modern *chef d'œuvre*, although very inferior in point of beauty, utility and durability. Skill, talent, genius exist the same in all ages. But the *results* of these, applied to science or mechanism, will vary in direct proportion to the material and instruments used. Thus Herschel and Rosse

unfold to us more of the heavens than the superior genius of Galileo or Copernicus could do: and La Place with his improved calculus solved problems, that defied the wonderful powers of the great Newton. Were Archimedes living now, his steam engine would be the world's wonder. As his genius, acknowledging nothing impracticable, asked only a "place to stand" that he might "move the world:" so mechanical genius, in all ages, ask only the material and the tools for working out the "impossible."

Let us then be careful that in the pride of progress, we do not under-value the genius of the past. Perhaps with our means, it would have done more than we: certain it is, that for what we can do, we are largely indebted to what it did before us. The genius of an era is to be measured less by results attained, than by difficulties overcome. Indeed, it is not a little to be feared that the abundance of resource, in certain departments of dental art, has induced a neglect of skill.

Applying these thoughts to the practical points now under consideration—we cannot take any better impression than did Hudson, Greenwood or Gardette unless we have better materials and appliances; and not so good, with all these advantages, unless we exercise more or less of their skill. The cup used in those days was suited to the work then made. As the style of work improved, inventive talent supplied a corresponding improvement in the forms of impression cups.*

Change in the styles of work demanded also change in the impression material. When plates were made of bone,

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*Since our last article, we are pleased to notice that an enterprising firm have supplied the profession with the form of cup (the outer curve meeting the flat bottom of the cup at a right angle) for partial impressions, there referred to, and which we regard as an essential part of a dental outfit.

We should have mentioned also, among the improvements in this department, Dr. Bean's very simple and ingenious method of making the "swaged cup" adhesive on its palatine surface, so as to retain very thin layers of plaster.

ivory or hippopotamus tooth, the minute accuracy of plaster would have been useless, since the carving out of the plate and fitting by "trial" could give only approximate results. So also, when the French artificer takes his lump of gold and, with his hammer and stake, works out his plate and fits it by "trial," the same holds good. Also in case of the porcelain plate which, becoming too small by shrinkage, is ground out by wheels and fitted by "trial," an exact fit is impossible.

But when we use a plastic material, which like the vulcanite, copies the minutest lines, it is clear that we require an impression material capable of more accurate definition than wax can give. Yet even here, without inquiry into the characteristics of the vulcanite plate, we cannot decide upon the relative merits of plaster and wax.

The introduction of plaster and gutta-percha as impression materials is undoubtedly a very great improvement; for with them we can do in a large class of cases what, otherwise would be impossible, or else imperfectly done. But when we adopt either of these valuable materials, to the exclusion of wax, we rob our laboratory of a material as useful as it is old-fashioned. It is scarcely too much to affirm that the exclusive use of plaster is no improvement upon the exclusive use of wax: any more than the introduction of plastic work justifies the exclusion of swaged work.

True progress lies in "abundance of resource," from which may be drawn what is best suited to special cases. And unless one inquires carefully into the distinctive properties of a given material, and also into the distinctive wants of a given style of work, it is impossible for him to become a progressive practitioner. Without this discrimination the advocates of wax and plaster may debate *ad infinitum* and still be like the knights of the silver and golden shield—easily reconciled by a glance at the other side. Briefly, wax can do what plaster cannot and plaster can do what wax cannot, and either will do very well, all that ordinary operators seek to accomplish.

Now let us apply these principles, in deciding how far we have improved upon the one impression material of the older dentists—bees-wax.

It becomes by heat very soft and plastic, but rather less so than gutta percha and much less so than plaster. Hence soft parts that must be copied *in situ* require plaster, which permits the softest tissues to preserve their normal relation. But, for the same reason, wax is best in all those cases—and they are not few—in which the membrane covering the alveolar ridge and palate is to be copied in its state of closest compression. The careful operator need not be told that there are cases, in which it is difficult to decide which plate will prove more serviceable, that fitting the loose, or that fitting the compressed, tissue: but this difficulty does not affect the present question, and plaster alone cannot meet all cases.

Wax is absolutely non-elastic and does not contract, on cooling. In these respects it differs from gutta-percha which, especially if too cool, offers an elastic resistance under pressure, and which has a very decided contraction. The routine-practitioner rejects gutta-percha because of this last-named property; unless he can control it, by causing the material to cling fast to the cup (making it adhesive by a momentary application of dry heat before placing the plastic mass in the cup). The eclectic operator recognizes, in this property, an advantage possessed by no other impression material and allows it full play. Hence he will succeed with vulcanite plates, in a certain class of cases, where plaster will certainly, and wax probably fail.

We have just said that wax does not contract. Many persons, misled by over-exact experimenters, hasten to pour their plaster models, while the impression is still warm—a wholly unnecessary haste. Possibly the contraction of *melted* wax misleads many. The contraction of a lump of plastic wax, in which the semi-crystalization is completely broken up by the necessary kneading, is a

very different thing. Theoretically it is very slight, practically it is nothing; in any case it is more than offset by the expansion of the model.

This property of wax places it midway between gutta-percha with its marked contraction and plaster with its expansion. Now it is an unquestionable advance in dentistry, which gives this choice of three materials that shall form a model—smaller than, equal to, or larger than, the mouth. For, paradoxical as it may seem, we utterly deny that an "exact fit" is always the best fit. So long as mucus membranes differ in texture, so long is it essential to discriminate between plates that must exactly fit and those which should be smaller—and if smaller, whether uniformly or irregularly so.

It will be seen therefore that the expansion of plaster may be an objection to its use. The objection lies with much force in certain cases: but becomes unreasonable unless we carefully inquire into; *first*, the actual effect of this expansive property on the impression itself: *secondly*, the kind of mouth to be fitted: *thirdly*, the class of work to be made.

As to the first point, the simple statement of expansion will not explain the differences in the four following plaster impressions of the same mouth—first, with a thick layer of plaster in an ordinary rigid smooth brittania cup: second, the same in a soft and rather flexible cup; third, a very thin layer in a cup swaged for the case, or in a strong gutta-percha cup; fourth, a thin layer, in one case adherent to a rigid cup and in the other case free to expand upon it. These differences cannot be appreciated, (for it is almost impossible to measure them unless by their practical result upon the fit of the plate,) except by careful inquiry into the amount and force of expansion. If, like the expansion of metal, it is irresistible, then any attempt to restrain it will be apt to result in a warping of the impression, fatal to success. If it can be controlled by the cup, the manner and amount of force

necessary must be considered. Again, if the expansion is desirable, care must be taken that it is not prevented. Thus we see that plaster impressions are not necessarily uniform. Important practical differences will result from the method employed, and we shall have—one, a warped impression, one slightly larger, and a third decidedly larger than the mouth. A series of careful experiments would add much to our knowledge of the exact shape of plaster impressions, and might assist materially in accounting for the failure of some plates, made from plaster impressions, inexplicable on ordinary grounds.

For the various forms of plastic work, such as vulcanite, cast aluminum and cheoplasty, applied to *partial* cases, impressions in plaster are essential to accuracy. For partial vulcanite cases, neither wax nor gutta-percha are at all comparable with it. Whereas for *full* vulcanite cases, wax is in many cases much to be preferred and sometimes the shrinkage of a gutta-percha impression will give an excellent adaptation. These remarks apply to the upper jaw; in the lower jaw, plaster is inferior to either wax or gutta-percha, whatever may be the style of work, unless the ridge is firm and well defined.

Cast aluminum, owing to its great shrinkage, demands all possible compensation, that the expansion of plaster can give; hence, for this work, all full sets should be taken in plaster. The same is true of tin and other cheoplastic metals; but in less degree, as the shrinkage is much less.

Swaged plates made upon zinc dies do not permit the use of gutta-percha, unless shrinkage can be prevented. The contraction of the zinc gives all the reduction in size which some mouths require, and more than others will allow. Hence plaster impressions for full cases are proper here, when they might not answer for the same cases in vulcanite. The advantage frequently urged in favor of plaster—the minute accuracy of the fine lines and rugæ—holds good in plastic work; but in swaged work it

amounts to nothing, for zinc (the hardest metal used for dies) cannot impress these fine markings upon a gold plate ; nor are they necessary.

A decided advantage of plaster is the permanence of its shape under the strain of removal from the mouth. Much skill is required to prevent the distortion of wax and gutta-percha, and they should be made as hard as possible by cold cloths, before removal is attempted. But a novice, attempting a partial impression with gutta-percha, when the inclination of two teeth forms a dove-tailed space, and making it *very* hard before attempting to withdraw it, will learn a lesson not soon forgotten. In such cases wax will yield at the expense of accuracy ; plaster will break and the pieces can be replaced ; but gutta-percha neither gives nor breaks.

For use in cold weather paraffine improves the plastic quality of wax, causes it to soften at a lower heat and to become harder when cooled in the mouth. For winter use we consider it by far the best form of wax in use : but quite inadmissable in warm weather unless it is hardened in the mouth with ice. For summer use the older dentists employed white wax or certain forms of vegetable wax. The compound of wax and gutta-percha is well adapted to the same end : but its color is not very agreeable to fastidious patients.

In conclusion we may thus sum up the progress of dental art in the matter of impression materials. We have in addition to the one material of the older dentists, WAX, two valuable modifications thereof, by mixture with paraffine and with gutta-percha : and two new and most important materials, PLASTER and GUTTA-PERCHA. Having certain plastic properties in common, they have distinctive qualities, which when correctly understood, add very largely to the dentist's ability to meet the requirements of new styles of work, unknown fifty years ago. The dentist of to-day can afford to neglect none of the three : and the young dentist, who neglects wax because it is old-

fashioned is as ignorant of what constitutes *real progress* as the old dentist, who will not adopt the newer materials. The important work of taking impressions may, not inaptly, be, likened to a tripod: any one of its three feet taken away, it has an uncertain support.

SELECTED ARTICLES.

ARTICLE I.

On the Various Risks of Operations.

By JAMES PAGET, F.R.S., (delivered at St. Bartholomew's Hospital.)

(Concluded.)

There are many patients to whom you cannot assign a morbid constitution, but who are feeble in all their processes. No organ, it may be, works wrongly; but no organ works with due power. Many children are in this condition, and some adults, whose condition has been admirably portrayed by Dr. Chambers in his book on Italy. They are not always bad subjects for operation. Repair will probably take place in them as feebly as any other vital process; but I believe they are not particularly liable to the disease after operations from which the greatest risks arise. Children of this class you should be cautious of operating upon for harelip or other such defects as do not urgently require interference, and in adults, if you can defer operations to some period of better health, you should do so; but all this for fear of local failure rather than of incurring any unusual risk of life. For in the management of these, as of all cases, you will find that the chief vital risks of operations are not through mere defects of power, but through disease. The measure of danger is not in the proportion between more or less of vital force, and more or less of exhaustion, but in the amount of liability to real disease of the blood and tissues.

You often hear me speak of patients as "cold-blooded." I do not know that the whole of their blood is less warm than that of ordinary persons, but some of it is, for their hands and feet are seldom or never naturally warm; and some of them feel, when you touch them, as cold as reptiles in the same climate—their hands and feet feel as moist and damp as toads and frogs. The circulation in all these cold parts is of course very slow, and probably it has not a due velocity in any of their textures; for wherever you can see vascular parts in them, they are of duller tint than they should be, dusky, and with a purple hue rather than a rosy one; and with these signs you find small pulses, and general indications of slowness in all vital processes. They digest slowly, and are very prone to constipation; and the women amongst them menstruate disorderly, and are liable to headaches and backaches, and a variety of nervous symptoms. People of this kind are so numerous that you will do well to look out for them among your cases, and to treat them specially with iron, with particular regard to this cold-bloodedness and slowness of life. They are not bad subjects for operation; rather, I should reckon them amongst the good ones; for they have always seemed to me singularly little liable to fall into the troubles of erysipelas, or pyæmia, or any other disorders of the blood: and the healing of their wounds is apt to be interrupted. Observe their defects; minister to them with warmth and good food, but not high stimulants or great eating, and they will do as well as any you will have.

And, to finish this account of the influence of diseased, or disorderly constitutions on the results of operations, let me tell you of the people that are commonly called "nervous." I do not refer to those with manifest disease in any part of their nervous system, but to those that are exceedingly sensitive, mobile, and excitable, whether in their sensitive or motor organs—who are very emotional, and with their whole cerebro-spinal nervous system altogether

too alert. You will find them and their friends always apprehensive of the results of operations; they will tell you that they are so nervous they can bear no shock; and they look with the greatest apprehension upon the inflictions of any injury. All this is fallacious. You may be surprised at observing how very little influence upon their organic processes this excessive vivacity of their cerebro-spinal system exercises. Time after time I have found patients who have complained of agonies in their wounds, and I do not doubt have felt them, but whose pulses have been unmoved. They have had enormous pain, but no fever, no single sign of disturbance of their general nutrition; they have had spasmodic movements of their limbs, tremblings, and rigors, but no mischief has followed. Besides, the same mobility of mind which makes these patients very fearful before an operation makes them hopeful directly after it; and amongst all the people that can in any sense be called invalids, I know none who more generally pass through the consequences of operation with impunity than do those who are commonly called nervous, and whose nervousness consists, if I may use the expression, in too great a vivacity of their whole cerebro-spinal system.

Sometimes you may be forced to operate during the continuance of an acute disease; and although the circumstances of the case may give you little choice as to whether you shall operate or not, it is well to be aware of the degree in which the acute disease may influence the result of your proceedings.

Patients with ague bear operations as well as others of the same class; but, in the course of their recovery, they may alarm you by having one or more ague-fits, exactly resembling those that precede pyæmia. And more than this: if a patient has ever had ague, and even many years afterwards, you perform an operation on him, ague may seem to be renewed in him at some short time after the shock, or loss of blood, or whatever other damage he may have sustained. I have so often noticed this, that when-

ever I hear of severe rigors following on any operation, I ask for a previous history of ague; and I have sometimes found that the patient has almost forgotten it in the long lapse of time since he suffered from it.

The question of amputation often arises when the patient is suffering with erysipelas, or with that spreading inflammation of the cellular tissue which is closely akin to erysipelas. I have often said to you that upon a secondary amputation as a confession of either a mistake or a disappointment. Either a primary amputation ought to have been done, and by mistake it was left undone; or if for any apparently sufficient reason it was not done, the necessity of doing, the secondary amputation implies the disappointment of just hopes. I have spoken with this disparagement of secondary amputations because the necessity for them is so likely to come when the probability of success is reduced by the operation being performed while the patient is in acute disease. I cannot tell you the numerical increase of risk; but I believe that the mortality after amputations during erysipelas, or spreading cellular inflammation, would be found very much greater than that of primary amputations, or of secondary amputations done for merely wasting suppuration or irreparable local damage. I scarcely know any set of cases in which I have operated with less hope than in those of compound fracture, or similar injuries, in which the question is raised whether a patient, who seems dying with acute disease, may have what is called a chance of his life by amputation. In the large majority of such cases the chance by operation seems to be less than that of keeping the patient alive by the ordinary treatment of erysipelas, or whatever other acute disease he may be suffering with.

What are the chances of recovery from operations done during pyæmia. I think I can answer safely, that in acute pyæmia in which the patient has rigors once or more in a few days, and profuse sweatings, with very rapid pulse and breathing, and with delirium, and rapid

wasting, or with dry tongue and yellowness of skin, or any considerable number of these symptoms, the probability of good is so small, and of harm so great, that you should refuse to operate. But in chronic pyæmia, when the disease requiring operation adds largely to the exhaustion from which the patient is suffering, the removal of the disease may be very proper. Suppose, for example, a patient with a crushed foot or a crushed hand, in whom signs of acute pyæmia have recently appeared. Whatever be the state of the injured part, I would not add the damage of an amputation to the burden that the patient already has to bear. But if the pyæmia have become chronic, attended with only wasting and sweating, and the formation of abscesses here and there, and if the injured part be manifestly useless, and a source of irritation or of exhaustion, the mere existence of pyæmia in the chronic form would not turn me from the operation required by the part. The occasions for operating in any other than these acute diseases are not many, but in diptheria or croup you may have to perform tracheotomy, and during peritonitis a hernia may require operation. These are all cases of necessity, and their results are not materially affected by the general acuteness of the disease. If their local good is accomplished, the healing of the wound and the recovery of the patient may occur as any case, unless indeed, (which I have never seen), a wound after tracheotomy should itself become diphtheritic.—(*Lancet.*)

ARTICLE V.

Remarkable Malformation.

By W. S. Carter, M.D., Pittsboro, Ind.

Mrs. W. was delivered, after an easy labor at full term, of a living male child. The infant was perfectly quiet for a few minutes after its birth, and then spasmodic res-

piratory efforts were made. Thinking the throat might be obstructed by mucus, I endeavored to introduce my fingers to remove it. The fingers passed readily between the lips, but to my astonishment I could get it no further than the gums, which both by sight and touch I found firmly united.

As it was necessary to act promptly, I immediately, with the assistance of my partner, Dr. Tilford, divided the tissue uniting the gums. This appeared to be about as thick as the gums, and cartilaginous, extending as far back on either side as the angle of the jaw. Notwithstanding this free division, which enabled the child to breathe with more facility, the jaws were immovable.

After letting the patient rest a few hours, Dr SELLERS, of Brownsburg, visited the patient with me; and it was decided to use some force to separate the jaws, and make a further careful exploration. This exploration showed us a tough membrane, one-eight of an inch in thickness, passing from the palate bone above, and inserted into the lower gum. Upon the division of this, and the use of some little force, the jaws were separated.

In two weeks the gums had healed, the child took nourishment readily, and was doing well.

Other malformations also existed in this case, viz., the fingers and toes were webbed, and the ears were in rather a rudimentary condition—the integument passing from the head over the anterior surface of the upper third of each of these.

When the mother was about three months pregnant, her son, about six years of age, had a severe convulsion, the jaws being spasmodically closed. She was alone at the time, and her terror was excessive; and, indeed, since then, during all the remaining months of her pregnancy, she states the frightful scene has scarcely ever been absent from her mind.—*Western Journal of Medicine.*

ARTICLE VI.

On Beeswax.

By Jas. F. Babcock.

The name *wax* is given to quite a number of bodies of very different origin, of which that secreted by the *Apis mellifica* is the type.

It is found in the pollen of most flowers, in the amenta of the birch, hazel, willow, oak, and in solution in the milky juice of the cow-tree. The brilliant surface of the petals of flowers is due to it. The surface of the stalk of the sugar-cane, the green fecula of the cabbage, the stones and skins of many fruits and the berries of the *Myrica angustifolia, latifolia*, as well as the *cerifera*, afford it in greater or less proportion.

A fertile specimen of the latter will yield about seven pounds of berries, which contain twenty-five per cent. of wax. The wax from plants is extracted by boiling them in water, to the surface of which the wax rises, and, on cooling, may be easily removed.

It is not proposed to describe these varieties of wax, but to confine the essay strictly to the title. The following table gives the principle properties of these different bodies, as well as that of ordinary beeswax, both bleached and yellow.

	C	H	O	Melt'g point.	spec. gr.	
Beeswax, yellow	80 20	13.44	6 36	149°F.		Lewy.
" bleached	79 20	13.15	7.65	157°F.	.996	Lewy.
Vegetable wax, Japan	70 00	12 07	17 93	104°F.	.970	Thompson.
Myrtle wax	74 23	12.07	13.70	109°F.	1.015	Giradin.
Brazil wax	71 88	12.03	16.09	206°F.	.980	Brande.
Cow-tree wax				137°F.	.969	Thompson.
Palm wax	80.28	13.20	6.52	161°F.		Lewy.

The wax of vegetables, with the exception of Japan wax, is less combustible, and less easy to bleach than that produced by certain insects of the order *Hymenoptera*, particularly the honey-bee.

These insects secrete the wax under the rings of their abdomen, and construct with it the hexagonal cells into which they deposit their eggs and honey. To procure the wax, the honey-comb is pressed to separate the honey from the wax. The cakes thus formed are thrown into boiling water, which dissolves what honey still adheres to the wax, which melts, and, rising to the surface, forms, on cooling a solid cake. This being separated and remelted, forms the crude yellow wax of commerce.

In this state wax owes its color, its aromatic odor, and its peculiar consistence, to foreign bodies, and, in part, to a small amount of honey.

It is bleached by the French in the following manner:

It is melted in copper vessels, and after complete liquefaction, is agitated with 8 oz. of pulverized cream of tartar for each 100 lbs. After some minutes' agitation it is allowed to deposit its impurities, and is drawn into a wooden vessel and allowed to deposit a further amount of foreign substance,—dirt, sand, bees, etc.—and while still liquid, is drawn upon a little roller partly immersed in water, to which a regular rotation is given,—thus producing thin sheets or ribbons of wax, which may be detached from the roller, being now ready for the process of bleaching. This is accomplished by the exposure of the yellow scales and ribbons, upon cloths, to the direct rays of the sun and the dew, for several days, during which time the wax completely loses its color. It is, however, in practice impossible to bleach the wax at a single operation, as the effect takes place only on the surface, and, as the ribbons have a certain thickness, it is necessary to melt them anew, and having repeated the operation of granulating, it is submitted to a second exposure. The wax thus bleached is melted, and cast into discs of one or two ounces weight, and forms the *Cera alba* of the Pharmacopœia.

Wax from different localities does not bleach with equal facility. That from the East, from Barbary and from the central portions of France, is bleached with ease. Wax from Brazil is bleached with much difficulty.

Chlorine cannot be used to bleach wax—at least when the wax is to be used for medicinal purposes, or for candles.

It is bleached by this gas, but it combines with it, and liberates one equivalent of hydrogen.

It was in examining the action of chlorine upon wax that Gay-Lussac discovered the principles of substitution.

I am not aware of any experiments having been made with sulphurous acid, which it is not unlikely might prove of service in this direction.

Beeswax, when pure, has neither taste nor smell; as is seen by the table, it melts at 157° F. and is of a specific gravity of 966. It burns without smoke or disagreeable odor.

It does not furnish, by destructive distillation, either sebacic acid or acroleine, which property affords a very simple method for ascertaining the absence of tallow, fat, or any body containing stearine, oleine, or margarine, which, under the same circumstances, furnish more or less of these substances.

It is insoluble in water, but soluble in all proportions in the fixed and volatile oils, bisulphide of carbon, and benzine. Its complete solution in these substances demonstrates its freedom from fecula, sulphur, sawdust, or bone-dust, which have been found in the wax of commerce, sometimes amounting to 60 per cent. of the whole weight.

Several bodies have been isolated from beeswax: ceroleine, amounting to about four per cent.; myricine, thirty per cent.; and cerine, sixty-five per cent., being among the number.

It is saponified with greater difficulty than fatty bodies, but furnishes a handsome soap,—a product holding a prominent place among the chemical *novelties* in the British section of the Paris Exposition.

The abundance and low price of paraffine have made this substance one of the principal articles used in the fal-

sification of wax, and perhaps of all others it is the least objectionable, being without marked physiological effect upon the system.

In answer to the last portion of the query,—wax substitutes—it appears to the writer that paraffine is capable of taking the place of wax to a much greater extent than has been supposed. When melted with oils, it forms crystaline scales on cooling; but this property is entirely destroyed by the addition of five to ten per cent. of wax,—this addition causing the mixture to cool in a homogeneous mass, without crystallization.—*Proceedings of Ph. Ass.*, 1867.—*Druggists' Circular.*

ARTICLE VII.

Ulcers of the Mouth.

A paper read before the St. Louis Dental Society, by HENRY S. CHASE, D.D.S.

THE ulcers found in the mouth are various in their appearance and pathology, and still more various in their origin. Ulcers of the mouth or any other part of the body are seldom idiopathic, but *rather* symptomatic. That is, they are rarely local in their origin, but are, on the other hand, only symptoms of some general dyscrasia, or of some local disease in another part of the body.

Young practitioners of Surgery are too apt to limit their view to the object before them, instead of looking for the forces which produced and sustain that object. The true medical philosopher must embrace in his investigations all those elements which act as *causes* for the production of those diseased conditions which he is called upon to relieve and cure.

If then the cause of an ulcer or ulcers in the mouth is not localized in the mouth itself, we must push our in-

quiries and investigations in that direction which will reveal it. To this end we must not only form our judgment from present symptoms, but we must, by inquiries from the patient, elicit the information we desire. And right here we see that the *medically* educated dental practitioner has a vast advantage over one who has not acquired such knowledge. The latter is groping in the dark among such inquiries, while the former enjoys the delightful sunlight of scientific knowledge, and focalises this light whenever and wherever he pleases, for the gratification of his own scientific tastes and for the good of the world around.

If the dentist is not often called upon to treat a great variety of ulcers of the mouth, it is for two very good reasons, namely: first the *patient*, thinking him ignorant of medical knowledge, does not apply to him for relief; secondly, most of the ulcers of the mouth are concomitant with some other disease, which is being treated by the general practitioner.

Notwithstanding these facts let us study the subject, and make ourselves somewhat familiar with it, for our responsibilities are not in the least lessened by the ignorance of the public, or by that of others in our profession.

WHAT IS AN ULCER? It is a disorganized portion of either the external or internal skin, involving more or less of the loose cellular tissue beneath it; having also a circumscribed size and shape, dependent on its pathological character.

We have ulcers in the mouth resulting from syphilis, mercurial poisoning, stomatitis, typhoid fever, typhus fever, intermittent fever, scarlet fever, scrofula, bilious fever, dyspepsia, etc., etc; also, the nursing sore mouth of mothers or nurses.

In addition to mercurial poisoning, there is also that produced by arsenic, nit. acid, mur. acid, sulph. acid, and other drugs. In scorbutic diseases there are also ulcers of the mouth. Now the treatment of these ulcers must ac-

cord with that of the disease to which it is correlated. The treatment of an ulcer of the mouth resulting from syphilis, must be the same as that of syphilis itself; and so too in regard to every affection which I have named. Therefore I will leave the study of most of these ulcers for the time when the original diseases themselves shall be considered, and for the present only speak of that more common condition of the mouth which we are called upon much oftener to treat.

STOMATITIS MATERNA.

This is a disease peculiar to women during the periods of gestation and lactation. It is a constitutional disease, having its origin nearly always in mal-nutrition. There is a greater call on the stomach for the ingestion of nutritious food than in ordinary conditions; for the blood must now furnish to the various tissues of the new being those elements of which it is to be composed, and the food itself must contain those elements in abundance or otherwise, the mother must furnish them at the expense of her own tissues. In the latter case there is *starvation* to a certain degree, and a similar state of the body ensues to that which is found in ship scurvy. Starvation takes place when any *one* of the important elements of the body is denied, as surely as though all of them are refused. In the disease of which I am speaking it is the phosphate of lime which the new being so loudly calls for, as it must be had, not only to form the bones and teeth, but also every other tissue and organ in the body. Flour eaters, or at least those who live principally on food made from the fine flour of wheat are particularly subject to this complaint; for the very good reason that there is scarcely any of the phosphate of lime in fine flour, it being nearly all left in the bran and coarse portions which are sold for the feeding of cattle!

The first symptoms are a feeling of weariness, not only of the muscles, but of the brain; the latter becomes dull,

wanting in activity, and desponding; there is a loss of weight in all the tissues; the blood becomes anaemic, or there is leukemia; the tongue is light colored, and the mucous membrane of the lips and mouth is pale and pasty; the teeth leave indentations in the sides of the tongue; the latter often becomes covered with pale, small ulcers, which sometimes coalesce so as to become large patches, and the same occurs also on the gums and cheeks. This pathological condition may be seen far down the throat, and doubtless does obtain in the stomach. There is a loss of appetite; there may be either constipation or diarrhea —the latter is the more common; there is sometimes severe, nervous headache—but oftener a dull and oppressive pain; accidental wounds heal with difficulty; pus cells are proliferated at the expense of the tissues; the breath is often sour; eructations from the stomach the same; the saliva has an acid reaction, and the teeth have an obstinate tendency to decay.

In the severest cases catarrhal symptoms come on, and there is a discharge from the bronchi of the lungs; and as exhaustion proceeds, the patient finally succumbs to literal starvation.

If a child is nursed by the mother it is not independent of the pathological influences affecting the latter; if it does not have apthæ itself it will be very likely to suffer from cholera infantum in the summer. In very many cases it ceases growing and becomes affected with rachitis. If it should live to erupt teeth they will be found to be very imperfectly calcified.

This is a terrible disease, and the more so because so insidious. The mouth trouble or stomatitis is only a symptom of the real disease.

It may be said that I have *overdrawn* the picture; I have only told the truth. But *every* case of stomatitis materna is not the result of impoverished blood, but may be the result of temporary indigestion; or of an irritation of the stomach produced by some article of food disagree-

ing with that organ, or else the effect of some medicinal substance taken purposely or by accident.

Now if it is true that this is a constitutional disease we must see that *local* remedies will fail. They may, and often do, relieve the mouth symptoms, and under their influence the ulcers may be temporarily cured, but they should be used in connection with those general remedies which will act on the whole system. It will be seen from *my* point of view that hygienic measures must be made very prominent in the treatment.

There should be a *nourishing diet* immediately prescribed, consisting of plain and simply cooked food which has not been robbed of any of its elements of nutrition. At the risk of being tedious I would name unbolted wheat meal, lean beaf and mutton, garden roots, fruits, etc.; also, light native wines and lager beer. I would prohibit fine flour, pork, salted meats, smoked fish, corn starch, pastry and confections, excepting simple fruit jellies, unspiced. There should be moderate exercise, fresh air, sunlight in abundance, daily tepid baths, and any other common sense hygienic measures that may suggest themselves.

Medical treatment may consist in the exhibition of small doses of mercury, quinine, rhubarb, nitric, muriatic, and sulphuric acids, or of citric acid. Arsenic also in small doses is very beneficial. Only *one* medicine at a time should be given, and it should be continued at least a week without change, if we would observe its effects. I think the acids will be found most beneficial where there have been mal-nutrition and starvation; mercury, quinine, and rhubarb, most useful in recent cases of gastric irritation; and arsenic in cases of great debility and prostration, especially when accompanied by catarrh.—*St. Louis Med. Reporter.*

CORRESPONDENCE.

"*Maryland State Dental Society.*"

THIS association held its regular monthly meeting in Baltimore, Jan. 30th, at the office of Dr. J. B. Bean.

The subject of discussion was "treatment of the dental pulp preparatory to filling."

Dr. Volck, who had been appointed by the society, at the December meeting, to make an analysis of "Welsh's nerve paste," reported that he had done so, and found it to contain arsenic, and other substances which he supposed to be morphia and a small quantity of rose matter. Dr. V's demonstration by means of Marsh's test, of the presence of arsenious acid in the preparation referred to, was very beautiful.

Dr. Bean explained, in very full detail, his method of employing aluminum as a base for artificial teeth; he exhibited his apparatus for the purpose, and explained minutely, all the steps of the process.

Dr. Arthur offered the following propositions to the association—

1.—That caries will attack the proximate surfaces of all the teeth, except the inferior incisors, of the great majority of persons in the United States, at the present day.

When caries of the superior incisors occurs on the proximate surfaces previously to the twelfth year, its occurrence, sooner or later, on the same surfaces of all the teeth, except the inferior incisors is almost certain. In the greater number of such cases the caries will show itself before the twentieth year.

This predisposition to dental caries is greater in the female sex.

2nd.—That caries is not liable to occur, at the points indicated, unless the teeth are in contact.

3rd.—That an artificial, permanent, separation of the teeth will arrest superficial caries or prevent its occurrence if the attack has not actually begun.

4th.—That it is a popular fallacy to suppose that caries necessarily follows the removal of the enamel.

5th.—That the most efficient means of preserving the teeth is to anticipate the attack of caries by separating them, when it is ascertained that caries is likely to occur on the proximate surfaces.

Dr. Arthur submitted the above propositions to the society, as the result of more than twenty-five years careful observation of the phenomena of dental caries, and stated his readiness to defend them against any one who felt disposed to dispute his conclusions.

Dr. Volck declared his intention of controverting the propositions of Dr. A. but desired some further time for preparation.

Dr. A. stated his readiness to meet him in discussion of the subject at any time.

S. H. WILLIAMS, *Pres.*

S. M. FIELD, *Rec. Sec.*

MONTHLY SUMMARY.

Muscular Contraction.—The advocates of the old doctrine that muscle is destroyed during contraction, and that the urea eliminated is the measure of this destruction, were confounded by the famous experiments of Fick and Wislicenus. Those experiments appeared to prove that the true source of muscular activity was non-nitrogenous food. Dr. Parker has taken up the interesting question and has studied the phenomena in two soldiers.

Without going into details, suffice it to say, that with the same quantity of ingested nitrogen, there was an increased excretion of azotized matter when the voluntary muscles were at rest, and that, on the contrary, in opposition to all our preconceived notions, this excretion was diminished during periods of active exercise. When rest, however, followed a period of active exercise, there was a slight but long-continued excess of nitrogenous excretions. If the supply of nitrogen was cut off for any length of time, there was a retention of this element in the system when it was again supplied by food, showing that a temporarily insufficient supply must be subsequently compensated.

Now, there is waste going on throughout the tissues. Gland cells, bones, nerves, tendons, all supply this current. The involuntary muscles too, are constantly eliminating it, and all this must be taken into consideration when we study the excretion of urea. As, however, this quantity is in a measure constant, we are left to account for the proportions excreted.

Dr. Parker suggests that exercise enables the muscles to absorb and appropriate more nitrogen from the general store of the blood, and that during rest they eliminate this element. A more abundant absorption would therefore be followed by a more copious excretion during the subsequent period of rest. This opinion, which seems justified by the experiments, changes the whole elements of the calculation. If correct, we must estimate muscular action not by the amount of nitrogen eliminated but by the quantity absorbed, if indeed, we ever can get at the latter.

"When a voluntary muscle" says Dr. Parker, "is brought into action by the influence of the will, it appropriates nitrogen and grows; the stimulus in the act of union gives rise to changes in the non-nitrogenous substances surrounding the ultimate elements of the muscular substance, which cause the conversion of heat into motion. The contraction continues (the will still acting) until the effete products of these changes avert it; a state of rest ensues, during which time the effete products are removed, the muscle loses nitrogen, and can again be called into action by its stimulus."

The theory is certainly ingenious and merits close and attentive investigation.

Cholera and Crocodiles.—A French writer maintains that the prevalence of cholera in India is due to the disappearance of the gavial, a species of crocodile native to the Ganges. This creature, he maintains, used to eat the bodies of the Indians, thrown into the sacred river by the superstitious devotees inhabiting its banks. The soldiers, however, have amused themselves with hunting this useful creature, which is now nearly extinct. The holy stream, missing its scavengers, revenges itself upon the slayers by spreading cholera far and wide. The writer asks government protection for the valuable reptile.

A New Styptic.—Perchloride of iron, combined with collodion is a good hæmostatic for wounds, the bite of leeches, etc.

To prepare it, one part of crystallized perchloride of iron is mixed with six parts of collodion. The perchloride of iron should be added gradually and carefully, to prevent the evolution of excessive heat, which injures the collodion. The composition, when well made, is of a yellowish red color, perfectly limpid, and produces on the skin a yellow pellicle which retains great elasticity.

Mental Labour and Physical Exertion.—It may be possible, at some future stage of scientific enquiry, to compute the comparative amount of oxidation in the brain during severe mental labor. Even now, from obvious facts, we must pronounce it to be a very considerable fraction of the entire work done in the system. The privation of the other interests during mental exertion is so apparent, so extensive, that if the exertion should happen tc be long continued, a liberal atonement has to be made in order to stave off general insolvency. Mental excess counts as largely as muscular excess in the diversion of power: it would be competent to suppose either the one or the other reducing the remaining forces of the system to one-half of their proper amount. In both cases the work of restoration must be on the same simple plan of redressing the inequality by allowing more than the average flow of blood to the impoverished organs, for a length of time corresponding to the period when their nourishment has been too small. It is in this consideration that we seem to have the reasonable, I may say the arithmetical, basis of the constitutional treatment of chronic disease. We repay the debt to nature by allowing the weakened organ to be better nourished and less taxed, according to the degradation it has undergone by the opposite line of treatment. In a large class of diseases we have obviously a species of insolvency, to be dealt with according to the sound method of readjusting the relations of expenditure and income. And if such be the true theory, it seems to follow that medication is only an inferior adjunct. Drugs, even in the happiest application, can but guide and favor the restorative process; just as the stirring of a fire may make it burn, provided there be the needful fuel. There is thus a definite, although not numerically stateable, relation between the total of the physico-mental forces and the total of the purely

physical processes. The grand aggregate of the oxidation of the system includes both; and the more the force taken up by one, the less is left to the other. Such is the statement of the correlation of mind to the other forces of nature. We do not deal with pure mind—mind in the abstract; we have no experience of an entity of that description. We deal with a compound or two-sided phenomenon—mental on one side, physical on the other; there is a definite correspondence in degree, although a difference of nature, between the two sides; and the physical side is itself in full correlation with the recognized physical forces of the world.—*Macmillian's Magazine.*

To Prevent Pitting from Small Pox.—It has long been known that the exclusion of light tends to diminish the effect of small pox in marking the face. Those parts of the body from which light is excluded by the clothing, present no permanent marks. Various devices have been contrived to exclude both light and air from the face in the eruptive stage—such as smearing with lard and ointments—covering with a mask, and so forth. Dr. Black, of London, (*Lancet*) considers nothing more to be required than to exclude light. In several cases he smeared the face with lard and kept the patients in absolute darkness, giving at the same time, in the iniatory stage, liq. ammon. acet. and liq. potass. arsen. one or two drachms of the former, and three drops of the latter, every three hours. After the acumination of the pustules, the liq. ammon. was suspended, and four or five drops of dilute nitric acid substituted, the arsenic being continued. His theory is that the variolous poison in the blood is neutralized in some degree by the arsenite of potassa; that the ammonia promotes the action of the skin, and that the acid promotes desiccation. Though he attributes the absence of pitting to the exclusion of light, yet he regards the internal treatment as important in preventing or moderating the fever.—*Pacific Med. and Surg. Journal.*

Compression of Carotids for Convulsions.—Some curious results of this treatment are given by a French practitioner, M. Favez. He relates three cases of convulsions in which it was successful. The first was that of a child, æt. 6 years, who had violent

spasms of the left side of the body, with clenched jaws, bitten tongue, etc. Compression of the *right* carotid stopped the fit immediately; the child fell asleep and awoke in full consciousness a quarter of an hour afterwards. The second was a girl of 7 years. She had convulsions of the right side of the body, apparently produced by fright. Here compression of the *left* carotid produced equally happy results. The third was a child of 2½ years, with convulsions of *both* sides. Compression of the right carotid at once arrested the movements of the left side. The left carotid was then compressed and the convulsions of the right side ceased. Sleep followed, and the patient awoke in an hour, quite well.—*Pacific Med. and Surg. Journal.*

The Human Voice.—Dion Boucicault, commenting on the Albert Hall of Science and Art, in the *Pall Mall Gazette*, says: "The human voice, when speaking with clear articulation and applied from good lungs, will fill 400,000 cubic feet of air, provided they be enclosed in a proper manner, and the voice placed and directed advantageously. The same voice singing can fill, with equal facility, 600,000 cubic feet. When singing, the vowels are principally used, because it is necessary to dwell upon a note, and we cannot prolong a consonant. In speaking, on the contrary, we depend for articulation on the consonants; but their short percussive sound does not travel. When we shout, or speak in the open-air which partakes of shouting, we prolong the vowels, drawling the syllable of each word; but what we gain in sound we lose in clearness of articulation; expression is lost in monotony, because its fineness depends on the infinite variety of which the consonant is capable and bestows on the vowel. Two thousand voices, singing or speaking together, travel no further than one voice. They may fill a certain area more completely with that intricacy of waves which, when very troublesome, we call a din; but each voice exerts its own influence on the air, according to its power, and dies away within certain limits. A second voice acts independently, and produces its own separate effect, not fortifying the first, but distinct from it. And so with any number of voices—say 10,000—shouting together; if a single trumpeter were placed among them, the note of his trumpet would be heard clearly at a dis-

tance where the Babel of voices would have expired in a murmer. Yet among the din produced by the 10,000 voices, the trumpet would be inaudible. To illustrate this theory more clearly, it is plain that 2,000 persons cannot throw stones further than one person. It is true that the air, within certain limits, will be more full of stones; but they will all come to the ground within a limited area.—*Druggists' Circular.*

BIBLIOGRAPHICAL NOTICES.

THE CHEMICAL NEWS.—This valuable scientific journal is now reproduced in this country at a very moderate expense. The London edition costs subscribers twelve dollars a year, while the American reprint is furnished at three dollars, and makes its appearance in monthly instead of weekly parts. Of the character of the publication it is not necessary to speak. It is too well known to need any commendation at this late day. Few men of science care to be without it, and it is invaluable to all who would keep up with the progress of Chemical and Physical Science.

W. A. Townsend & Adams, 434 Broome St., New York, are the publishers.

THE NEW ORLEANS JOURNAL OF MEDICINE.—The "New Orleans Medical and Surgical Journal" and the "Southern Journal of the Medical Sciences" have been fused into one under the title which heads this notice. The new journal is under the editorial management of Drs. S. M. Bemiss & W. S. Mitchell. It is a quarterly journal, well gotten up both editorially and mechanically. The original articles are numerous and valuable, and the selected matter is chosen with great judgment and embodies the most recent results in the medical sciences. We cordially welcome our new cotemporary and hope that its editors may meet with that abundant success they so richly deserve.

EDITORIAL DEPARTMENT.

The Baltimore College of Dental Surgery.—The Commencement Exercises will be held on Thursday evening, March 12, at the Concordia Building to which the alumni and friends of the college are most cordially invited. Dr. Noel, Prof. of Physiology will deliver the valedictory address. Quite a number of the alumni have already notified the dean of their intention to be present, and a very pleasant and happy reunion is anticipated.

It is always a pleasure to the members of the Faculty to receive visits from the alumni and friends of the Baltimore College, and they trust that none may absent themselves on account of not receiving invitations.

Cards of invitation are annually sent to the P. O. address of all the alumni, where such is known, and the dean would be pleased to learn of any change of location, in order that invitations and circulars may be properly directed.

The number of matriculants at the Baltimore College this session is sixty-nine, which we learn from reliable sources, is thirty more than at any other dental college.

This evidence of prosperity will be as gratifying to the friends of the institution as it is encouraging to the faculty, the members of which will do all in their power to sustain the reputation which this, the first established, Dental College has always maintained.

The New Preparations of Rubber.—In the February Number of this Journal we called the attention of our readers to two new kinds of dental rubber, the vulcanizing or hardening of which does not interfere with the Goodyear and Cummings' patents.

Since then we have received from Snowden & Cowman of this city, who are the agents for the sale of both preparations, samples of each, and the following is the result of our experiments with them.

Simpson's Rubber, from the Porter Manufacturing Company. Our readers will remember that Hale's rubber, under the Simpson patent contains only two and a half ounces of sulphur to a pound of rubber; the minimum fixed by the Goodyear patent being four ounces. The process of preparing the model, flask, &c., is the same with the Simpson rubber as with the Goodyear, except that a somewhat longer time is required for vulcanizing it. In the first experiments made with it, we ran the mercury up to 340° and kept up this degree of steam for fifty five minutes. The result was very satisfactory, and as far as we can judge from appearance and a trial of its strength, it is in every respect equal to the American Company's Rubber Other experiments were made by subjecting this rubber for a longer time to a lower degree of steam; heating up gradually 30 minutes to 320° and keeping it at this degree for three hours and a half which gives a lighter color and rather more elasticity. The directions accompanying this rubber call for 320° for three hours and thirty minutes.

The Iodized Rubber.—This rubber as we informed our readers in the February Number of Journal contains no sulphur, but is hardened by "bromide of iodine," the process being patented by Newbrough and Fagan. It is made by adding to iodine one-half its weight of bromine, the result being the proto-bromide of iodine, which when combined with rubber in the proportion of three ounces of the paste to a pound of the gum, produces a composition which will harden on being subjected to a dry heat of 310° Fah. for one hour.

The following comparison with Dental Vulcanite is given.

Iodized Rubber before baking.			Vulcanite before Vulcanizing.		
Rubber	Oz	16	Rubber	Oz	16
Bromide of Iodine	"	3	Sulphur	"	8
Oil of Vitriol	"	1	Vermilion	"	20
Vermilion	"	6		Total,	44
	Total,	26			
After baking.			**After Vulcanizing.**		
Rubber	Oz	16	Rubber	Oz	16
Vermilion	"	5¾	Sulphur	"	9¾
Sulphur of Iodine	"	¼	Vermilion	"	18¼
	Total,	22		Total,	44
Resume: Rubber 16, Foreign matter 6.			Resume: Rubber 16, Foreign matter 28.		

The following rules for baking the Iodized Rubber must be followed: After the wax is removed, the open flask is laid on the stove and *thoroughly dried* of all moisture. The case is then packed at a *low dry heat*, when it is put in the oven and the light applied. The heat is allowed to rise to 310° Fah. within 15 or 20 minutes, and held at this degree for one hour, after which time it is is increased to 330° F., for one hour longer. Ten minutes after the light is put out the flask may be removed from the oven and cooled with cold water.

For repairing, the piece is encased in the usual manner, but the "top half" of the flask only is dried.

The collodion varnish is used on the surface of the plaster as with the other preparations of rubber, and it is recommended to add one-fifth of pumice stone or fine sand to the plaster, and salt or a drop or two of sulphuric acid to the water used for mixing the plaster.

The iodized rubber will not harden on a moist plaster surface, hence the necessity to thoroughly dry the plaster in the flask. Our first experiment with the iodized rubber was made with the common vulcanizer and was a failure, it being necessary to use the oven prepared expressly for this compound. This oven consists of a cast-iron, cone-shaped boiler at least two inches thick in the bottom with a heavy lid placed over it; no packing or screws being necessary, as dry heat is used. The weight of the lid resting on the top of the boiler or oven is sufficient to confine the heat, which is generated by a small lamp placed under the apparatus.

Our experiments with the apparatus just described were perfectly successful, and the result was a hardened base of a somewhat darker color than the dental vulcanite, capable of being highly polished and apparently, as we have not as yet had an opportunity of judging by a trial in the mouth, as strong and durable as the best dental vulcanite base.

Elixir of Vitriol and Tannin as a Haemostatic.—The combination of elixir of vitriol and tannic acid, to which we called the attention of our readers in the February number of the Journal, has proved upon trial, a

very convenient hæmostatic agent for dental use. It has been found very effective in internal as well as external hæmorrhages, and is more agreeable, when applied to the mouth, than many of the agents possessing like properties. Dr. A. P. Merill became aware of its value in 1857 in a case of tonsilitis, where owing to the morbid condition, a thin slice was pared from the surface of each tonsil. But little bleeding followed during the day but at night after the patient retired to bed a serious hæmorrhage occurred. Dr. M. on being summoned found the pulse feeble, breathing labored and strength greatly prostrated. The pulsations of the bleeding artery in one of the tonsils could be seen and there was an oozing of blood from the cut surfaces. Having no other remedy on hand Dr. M. made a mixture of elixir of vitriol and tannic acid, and applying it freely, the hæmorrhage was he states immediately and permanently arrested. It is also effective in diarrhœa where astringents are indicated. We recommend this preparation for hæmorrhages following the extraction of teeth, in two cases of which we have successfully used it.

Causation of Phthisis.—Dr. Budd has astonished the English physicians by a new theory of the origin of this "endemic of the universe," as Dr. Bartlett used to call it. He thinks it a zymotic disease, like typhus or scarlet fever; never originating spontaneously but always transmitted by pre-existing germs These germs are the tuberculous matter itself which is transmitted from patient to patient, and which bears the same relation to the disease as the vesicles do to small-pox. He hopes that the destruction of this matter on its issue from the body will ultimately enable us to "stamp out" consumption entirely.

He thinks there is direct evidence of transmission from one person to another, an opinion long held by the Spanish physicians of the island of Cuba. He also maintains that many countries were free from this disease till it was introduced from Europe. He cites the South Sea Islanders, the North American Indians and the natives of Africa, who are all said to have known nothing of phthisis until civilization brought them its questionable blessings. Even now, he tells us that in Africa phthisis only prevails on the coast where the tribes come in contact with the whites, while in the interior where their intercourse is only rare and occasional, it is still unknown. Dr. Livingtone is cited as authority for the latter statement.

This is certainly a startling theory, and the acknowledged sagacity of Dr. Budd should secure for it at least a patient hearing and a candid investigation.

The Algoid Origin of Miasmatic Fevers.—We have already alluded to Prof. Salisbury's experiments and observations upon this subject. We notice that they are attracting attention on the other side of the Atlantic. The Lancet gives us an outline of the researches of Dr. Heinrich Schmidt, who studied the subject during the recent frightful epidemic in the Mauritius. In persons dying with fever, this gentleman found microscopic plants like the *Cryptococcos cerevisiae* covering the lining membrane of the

stomach. He was also able to detect them in the secretions of the corners of the mouth, of the tongue, and even upon the surface of the skin. He found allied forms in the water taken from the pools near the Grand River, and also from the sea at the mouth of that stream.

Another writer states that when examining the fructification of algœ, he was warned by his preceptor to be careful at the time of their fructification, as they would certainly give him intermittent fever. He thought however, that, as he was growing his plants in pure water remote from their marshy home, he might venture to disregard the warning. At the time they were throwing off the spores, he was nevertheless prostrated by a severe attack of intermittent fever.

Remedy for Cancer.—Dr. Hood, in a paper published in the *London Lancet* for January, reports a case of recovery from mammary cancer in an old woman of over eighty years of age. The remedy used by this ancient dame is of such a simple character, and the whole statement is made in such evident good faith, that we transcribe the concluding portio n of his communication entire.

"Although the diseased mass had separated itself from this lady's person, there still remained the peculiar odor common to external sloughing cancer. I inquired how it was she had resorted to this remedy, and she gave me the following history almost *totidem verbis*:—

"Some years ago a gentleman living near the town in which she resided had a tumor in his cheek as large as a small orange. It was about the time that the late Sir Astley Cooper gave up practice in London and came to reside at Hemmel Hempstead. This gentleman thought that he could not do better than go and consult Sir Astley about this tumor. Sir Astley saw it, and told him that it was a cancerous tumor; and strongly advised him to submit to its removal. This the gentleman objected to have done; when Sir Astley told him that unless he did he would not live beyond six months. On the following Tuesday, being market day, this gentleman was riding through the town, when an old woman accosted him by saying: 'I hope Sir you will pardon me; but, seeing your face tied up, may I ask what is the matter with you?' His reply was: 'My good woman, I have a cancer in my cheek; and Sir Ashley Cooper says I shall not live six months.' She rejoined: 'If you will try an old woman's remedy, I am sure it will cure it.' This the gentleman agreed to do; and in less than six months the tumor disappeared, and he got perfectly well."

This lady knew all the parties, and it was the success which attended the remedy in this gentleman's case which induced her to employ it in her own. The following is a verbatim copy she gave me of the directions for using the oyster-shell powder:—

"*For a Cancer.*

"Bake a quantity, say half a peck, of oyster-shells for three nights in a slow oven. Then scrape out the *small white* part of the shell, powder finely, and take as much as will lie on a shilling once or twice a day in a little warm water or tea. If that affects the system too much leave off a day or two and commence again.

"Should an ointment be thought desirable, mix the powder in cream, lard, or quite fresh butter without any salt in it, and apply it.

"This treatment generally requires perseverance for three or four months before its effects are seen.

"The shells to be used are those which are *concave*."

This lady lived for two years after my first visit to her, and ultimately died in en epileptic convulsion, when she was apparently in her usual health. The wound resulting from the separation of the cancerous breast never entirely healed, but she never complained of any discomfort from it.

I have been in possession of these facts for some years, but should not have made them public, owing to the difficulty I felt in explaining the *modus operandi* of the apparently simple remedy of powdered oyster-shell in so formidable a disease as cancer—notwithstanding that I had seen in the case of the lady recorded so remarkable a result from the use of the remedy, and having every reason to believe, from her known truthfulness the account she gave me of the gentleman who had experienced such decided benefit from it,—had it not been for a conversation I had recently with Mr. Spencer Wells, to whom I related the substance of the foregoing statement. He informed me that he attributed the efficacy of the remedy entirely to the lime contained in the powder. He told me that since he had read Dr. M'Clintock's observations some years ago on the influence of the chloride of calcium in checking hæmorrhage in patients who had fibroid tumours of the uterus, he had used lime largely in the treatment of these and other tumours; and he had become convinced that an atrophy and calcification of fibroid tumours, resembling the spontaneous change or degeneration not unfrequently observed in such tumors, was often produced or hastened by the use of lime. And he added that he had reason to believe the change commenced in the coats of the arteries supplying the tumors with blood; that these coats underwent first an atheromatous, afterwards a calcareous degeneration—in either case with a diminution of the calibre of the vessel and a lessened supply of blood. If the lime were too long continued, he believed that all the arteries in the body, not those in the tumour only, began to degenerate; the first evidence being the formation of an arcus senilis around the cornea.

The explanation appeared so philiosophical, that I felt I ought no longer to observe silence on a subject of so much importance, but to submit the knowledge of it to those whose opportunities of seeing diseases of a cancerous nature are greater than mine, and who might feel disposed to give the remedy a trial; as it is one that is not likely to do harm and *may* in some instances do good.

If there be any force in the reasoning of Mr. Spencer Wells on the facts which he has observed, I cannot see why the nutrition of malignant tumors should not be as readily affected by inducing atheromatous or calcareous degeneration of the vessels which supply them with blood, as the nutrition of innocent tumours would appear to be.

Lower Seymour-street, Portman-square, Sept., 1867.

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ORIGINAL COMMUNICATIONS.

ARTICLE I.

Address before the Graduating Class of Baltimore College of Dental Surgery, March 12, 1868.

By PROFESSOR HENRY R. NOEL, M.D.

[We present to our readers the admirable address of Professor Noel. To adapt it to our limited space we have been obliged to omit many paragraphs. We do this with the less regret, because at the solicitation of of the class, it has been printed, as delivered, and those who wish to see it in full, can obtain copies by addressing Dr. Noel or any other member of the Faculty.] EDS.

GENTLEMEN:

TO-NIGHT our collegiate work closes. Our mutual relations are about to be dissolved, and the ties binding professors and students severed forever. It has ever been deemed appropriate that upon such occasions, some one of your professors should, on behalf of the college, tender you a farewell and give advice and encouragement.

This honor has devolved upon me and places me in a position somewhat embarrassing. A medical man—I cannot give you advice about dentistry. The summers I have numbered, are too few, for me to assume the role

of the wise man of the world, and give you advice based upon practical experience.

There is, however a ground upon which we all can meet; there is a subject appropriate to the occasion. It is the

THEORY OF SUCCESS IN LIFE.

This theory is not genius—it is not the possession of a dazzlingly brilliant intellect. It is not so much the *original*, as it is the *acquired* power of mind; and it is found in the continuous application of mental force. It is perseverance—it is untiring work. A homely theme but one that comes searchingly near to the hearts of many, if not of all, here to-night. Certainly it comes very near indeed to us.

"We have *not* been born great;" "we have never had greatness thrust upon us;" and there remains you know but one other solution of the position, and that is

"To achieve it."

Achieve success—it is no boy's play. We should enter this struggle with no misconceptions of its extent; no misconceptions of its true meaning; but fully comprehending that in its height, breadth and depth is contained the very sum of our existence; the sum of our happiness—the realization and fruition of our hopes and our dreams; or hopes blighted—blackened—blasted—ruined. We must enter with all our mind, soul, and strength,—with no diffusion, but an intense concentration of mental force; for the struggle is the battle of life and we are well aware that the "laurel wreath" rests only upon the brow of him, who has known work in the bitterest acceptation of the term. Our ideas upon all subjects should be clear and definite, and this is especially true of our professional careers, for false impressions in early life, often lead to miserable failures.

Now, we shall tell you through what you must pass to success. But we shall point you out no gilded career,

no rose-colored path to greatness. The world has nothing of that kind for us, but it has another kind of road even to bare comfort no even graded level—no tessellated pavement; but rough—rugged, rocky;—tortuous, twisting, turning; ascending, descending, broken and uneven; with many a sharp angle and jutting crag athwart our path; with many a toppling fragment over head and yawning chasm beneath. Often worn and weary with much to dishearten, much to depress, with many a heartache and many a throbbing brow; we must tread the narrow path of self-denial and continuous labor.

The world has for us no honors, save those we wring from it by our own efforts. Through dreary months of anxiety and suspense; through long years of slow toil we must walk this path, and see the realization of our hopes yet beyond us—and often simulating the mirage of the desert, receding as we advance. We shall know well the yearning of the weary brain for rest; we shall know well the burning of the heart for sympathy in its hours of tension and strain, when encouragement falls like a heaven-sent shower upon a parched and thirsty earth.

You wish bread—you wish success—you wish honorable position. The marts of this world contain them all—but the currency it demands is coined brain—intellectual labor. There is no escape;—there is no reprieve; it is not optional—it is imperative, and a inexorable necessity has decided the future for us. The sentence once spoken at the gates of Eden, has reached down through centuries and crossed our path. The curse of the race is fulfilled in us, as it was in our first parents; the decree is fixed, the law immutable; and to it finite man must humbly bow. Man has been great—man can be great. What man has done—man can do, but only by self-conquest—self-denial, study, application, labor.

"The dignity of labor," a theme so very eloquently handled by our would-be orators, we do not appreciate.

We have known labor, intense labor, prolonged labor, but we have signally failed to perceive its dignity; in fact we see in it only the primeval curse. Labor was never intended as a blessing for man—at least we are not so taught in Genesis. Yet only by labor can true success be attained, it hasnever been attained otherwise, and through this avenue alone can *we* attain it. Its relation to us and to the world are such, that, it becomes the means of obtaining an end. The end is grand, but the means are not so.

The end is success—it is noble and worthy of any sacrifice, and we must make the sacrifice—a continued sacrifice of self. Now this is the plain truth—unadorned, unembellished—you must work—there is no escape. He who lingers in pleasure's paths, or stands in idle dalliance with fashion's votaries, is lost, lost, lost.

The true theory of success being work, what is the true theory of working successfully? We answer—to systematize—to concentrate. To obtain definite results, to obtain these in their highest perfection, we must acquire the habit of prolonged, continuous and intense concentration of mental power.

We must learn to concentrate the whole intellectual force upon a given point and hold it there, till like the convex lens converging and concentrating the diffused rays of the sun, we fuse as it were the dross of error and obtain imperishable truth. Throw mental light upon dark subjects — dispel the mists of uncertainty; — make the obscure bright and patent. One great element of success is the acquired habit of using the powers of the mind upon the convex lens plan of convergence—concentration.

Carlyle, we think it is, who eulogizes the beaver intellect; that intellect never brilliant, never dazzling, but which slowly, surely and inevitably attains its ends, secures its prize. Never daunted—never faltering—never wavering—never crushed—always working—never despondent—always hopeful: they toil onward and upward —higher and yet higher—until upon the summit they

watch the mists dissolving below them, and from their exalted position looking down, they reap the reward of concentrated, persevering, untiring effort. There is no other road—there is no success worthy of the name, that is not obtained by coined brain.

Thus far we have arrived at the conclusion that success implies an invariable antecedent, and that antecedent is labor. Now we wish to prove that labor is the law of developement both physical and mental.

We shall begin with the muscular system, and shall show you how more muscle, and more muscular power are acquired in direct ratio to the amount of exercise—amount of labor. We shall then reason by analogy from this to the nervous system, drawing aid from observation and practical experience, as we proceed. And we shall endeavor to prove that the law for one obtains in the other—and that the nervous system also, is developed by exercise—by labor.

The muscular system is the seat of muscular force, physical power; the nervous system is the seat of mental force, intellectual power; if therefore we succeed in demonstrating that labor is the law of developement for the one, by analogy it will apply to the other also, the deduction therefore will be that muscular and mental power alike depend upon exercise of their respective systems. Now there is not one thoughtful student present to-night, who does not believe in the entire truth of this statement.

As a practical fact too you know it. You know that the athlete and the victor in the prize-ring, attain their superiority by a rigidly systematic and protracted exercise of the muscular system. The degree of succees is in direct ratio to the developement of that system, and the acquired habit of using that developement. The result is the production of muscle and the scientific application of its action.

It is simply a correlation of force; the human vital force in the muscle is converted into motion; so much muscular

tissue is destroyed, and so much physical force realized in return. The relations are fixed—the factors are invariable; the law is exercise, the result is developement.

Look at the brawny arms of the blacksmith. Look at the huge muscles of the coal heavers. But your own experience is sufficient attestation of this, though very few seem to thoroughly understand the application of experience in proof of this law.

Which of you, gentlemen, first swung with ease, over your heads your 25 pound dumb bells? Which of you, but began with much lower figures, and gradually developed the power as you fulfilled the law of your physical being developement by labor? Labor being the law, what is the penalty of a violation of this law? What is the penalty of muscular idleness? You know it well. Loss of size; loss of control over the muscles, impaired vigor; impaired power; a slow decay; a species of caries of the whole animal physique. One example will suffice. You have a fractured arm—you carry your hand and arm splinted and slung up for from four to six weeks:—you take it down—remove the dressings, splints, &c.; the bone has knit—the limb is apparently sound: true; it is emaciated and looks the invalid. Attempt to straighten it—you cannot do it; the muscles stubbornly refuse to obey your commands. You have kept that arm quiet too long,—you have violated the laws of muscular action and muscular integrity. You have disobeyed the commands of nature—and nature's children in their turn disobey you.

How do you regain control over that limb? How make it again your slave? By *learning obedience*, by following the prescribed law—exercise. Surgeons call it "passive motion." Do you not see how *very rigidly* this law is enforced?

Idleness is therefore not merely non-acquisition, it is direct and absolute retrogression.

Can we apply this law to the nervous system, the seat of all intellectual phenomena? It is eminently true of

this system, for only through the nerves can the will act upon the muscles, and the education and developement of the muscular, presupposes and involves a species of exercise of the nervous.

The brain we know to be the great receiving and dispatching depot—the great magazine for storing up impressions; the great workshop—the grand laboratory for the evolution of mental force; and with its telegraphic threads or cords, which we call nerves, is in direct communication and relation with the whole body and external world. All moral, emotional and rational phenomena have their origin in changes of the substance of the brain. The brain is the seat of intellect.

We can acquire, by exercise, more muscular tissue and a better control over the tissue. Can we, by exercise, acquire more brain—can we acquire a better control over the brain?

Understand of course, that the brain is but the material instrument of that immaterial agent we call the *soul*. To answer the first question, would lead us into a physiological and metaphysical discussion, not suited to the occasion. But the latter we can answer boldly and clearly in the affirmative.

No one will deny, that by rigid training, by systematic exercise, the powers of the mind can be greatly increased, greatly developed, greatly intensified. What do we mean by education? Certainly not that ridiculously absurd idea of simply filling up the mind, as if it were a reservoir capable of holding exactly so much and no more, which when once filled was done with education. This is the almost universal idea, but an extremely fallacious one.

The Romans had a clearer idea than this. They did not consider mental training to mean cramming—filling; on the contrary with them it was *educating*, (from e—out of, and duco to lead or draw forth) and the idea is exactly correct—a drawing forth of the powers of the mind. Mental developement was but the drawing out and strength-

ening of the mental powers, according to the Roman idea, and we earnestly recommend you to adopt this idea.

The law of developement by labor obtains, the analogy between the two systems is therefore complete.

The mental athlete swings his intellectual dumb bells from the primary school to his college commencement, and then feels that he is only *beginning* to acquire some little skill in their use; that he is indeed a tyro upon the boundary of the vast world of letters; that work which is to tell upon the world has yet to be performed—his real labors have but begun. The collegiate training is but preparatory and at best but disciplines the mind for the struggle The true unfolding of the mental resources is by years of study.

We know the penalty of idleness ot muscle, what is the penalty of an idle brain? The phenomena are sad—very sad. The mind relaxes its efforts; the intellect looses its brightness; fancy checks her flights; imagination ceases to be vivid; the judgment is no longer accurate; and reason unhesitatingly accepts the most incredible statements, or rejects the most patent truths, being utterly impotent to grasp or handle, to weigh or appreciate the simplest arguments. Trains of thought there are not; but a confused series of disjointed, disconnected and illoglogical fragments are found upon this arid waste, this mental Sahara.

Beware of this quiescence;—beware of this lethargy of brain; this stagnation of intellect. The saddest of all sights are these poor, attenuated, emaciated, and dwarfed minds, these arrests of intellectual developement; and we can almost see that there is also spiritual atrophy, a sort of eremacausis of soul.

"In the sweat of thy face shall thou eat bread, until thou return unto the ground."

We understand this now—It is the curse of barrenness upon the earth, and reflected back upon the human race it becomes the law of developement. Adam was cursed;—

his whole race was cursed—this same curse rests upon your muscular system,—it rests upon your nervous system; it rests upon man's physical and upon his mental nature alike. This is the philosophical solution of the question;—this is why labor so inexorably preceeds and determines success. Therefore you must labor.

By labor you can advance—not to labor is retrogression. It is not optional. God has made the law imperative.

Achieve success. Success gives power, gives wealth, gives leisure, gives rest. Ambition is a sharp spur, but poverty is infinitely sharper and more deeply and steadily applied.

Remember that necessity is a bitter task-master, but one we may be called upon to serve, beware lest we fall into his hands unprepared, i. e. without proper mental culture. Many of us know full well this necessity—we have seen poverty in all its uninviting hideousness; we have seen it wring the heart, until its anguish was indescriable.

Lands, jewels, silks, clothing, the very shoes, and even the hair, woman's ornament, peerless woman's pride, sheared close and bartered for bread. Aye—more than this, we have seen this monster stretch forth its hand, and place its bony fingers upon the throats of its victims and hoarsely whisper in the ear—Starvation. And the cheek so hollow would sink yet more;—and the lip so blue with famine would turn yet darker, and upon the faces would settle that horrible expression of hopeless despair. This is no fancy sketch—the very breeze that comes from yon land, bearing on its wings the warm breath of spring, is also freighted with the cry for help, which rises from a crushed and a starving people. And *our homes* and *firesides* are there, there with that stricken people.

Oh! it is a hard, bitter struggle—this struggle with poverty. Brave must be the heart—unfaltering the courage; untiring the energy, if one shall combat poverty, and also desire to attain success. Many of you will need all we have stated, for you are to return to

that section of our country where the songs of the harvest reapers are scarcely heard, for the fields are lying fallow; where the streets of the cities are silent, and grass is growing through the pavement; where the shops are tumbling down; where the wharves are going to decay; where the school-houses are empty; where the churches are unfilled ; where the curse of poverty is upon the people, and the cup is being drained to its last dregs.

Now there is one more argument, or reason why you should "attain success" even at any sacrifice, it is one that comes from the homes you have left. And you owe this, to those you have left behind and are soon to rejoin: the circle gathered around the fireside to night in those distant homes thinking now of you.

From the dark lagoons of Texas,—from the untilled cotton fields of Georgia and Alabama, from the hills of Tennessee, from the rice lands of the Carolinas, from Virginia's blood-stained bosom, from all that country "bowed down beneath a weight of woe," over whose once fertile fields, the roughened ploughshare of a brother's hate, has run in war's red maddening carnival, rise the prayers of sisters, the prayers of brothers, the prayers of fathers and the prayers of mothers. And their hearts turning to-night, northward to Maryland, even as turns the Moslem pilgrim to the shrine at Mecca, they turn to Baltimore. Their pride, their love, their treasures, and in many instances their only hope for the future are here —here with us to-night.

Shall this appeal be unheeded? can we appeal to you by anything stronger than—*By that country, sad and desolate? By the charred remains of the burned cities. By the blackened ruins of once happy homes. By the hopes thus blighted and blasted. By the sister's worn and weary look of anxious toil. By the father's faltering step and furrowed brow. By the mother's sad, stricken face and earnest prayer. By that bitter poverty, which holds them in its merciless and ever-closing grasp.*

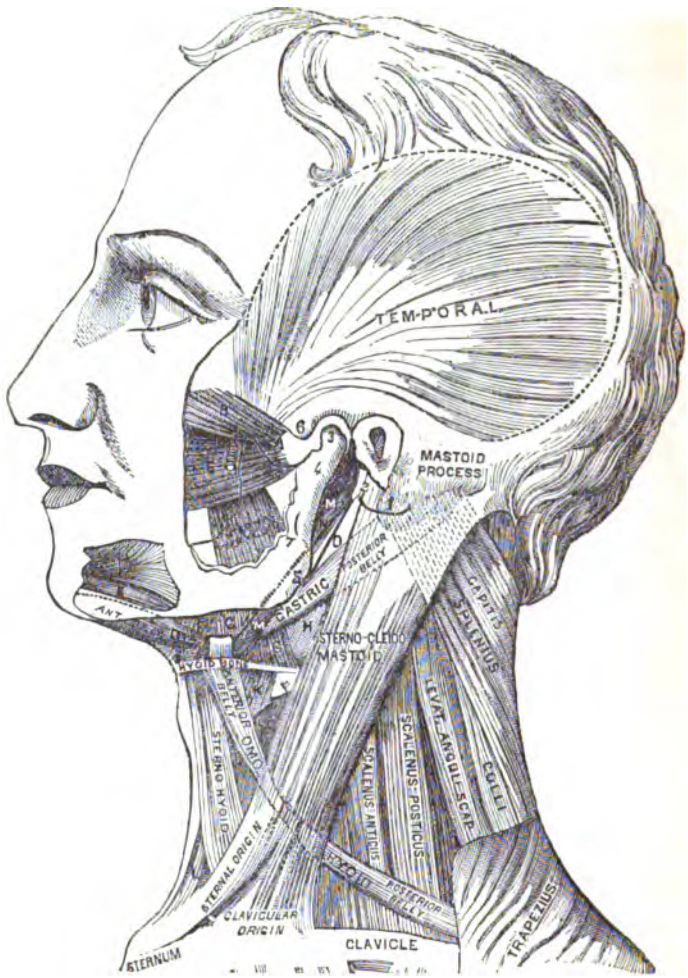
By the graves of the dead, and the altars sacred to them in memory—be true to the laws of your being—attain success.

By patience, courage, self-denial, and unceasing labor, acquire the power, and the means to aid in paying the price of their redemption from the servitude of this abject want. You can and you must attain success.

Many fail because they do not work. Fail because they never systematize. Fail because they never have definite aims. Fail because the first reverse disheartens. Fail because such rigid self-denial is required. But to us there must be no such word as failure,—there is too much at stake, we cannot afford to fail—unless life fails first.

Your professors extend to you the warmest feelings of interest and friendship. They will rejoice in your prosperity. They will sympathise in your adversity. They will deeply regret—should any one of you make a failure in life.

They earnestly hope that in future years your names will be known, as those of true scholars—true workmen, and characterized by scientific research and professional acumen; that your Alma Mater may be proud of her sons.



1. **Centre of the condyle upon which the head rocks. 2. Styloid process. 3. Condyle of Lower Jaw. 4. Neck of do. 5. Angle of do. 6. Eminentia Articularis. 7. Curve upon which the jaw opens.**

A External Pterygoid. B. Upper head of do. C. Lower head of do. D. Genio-Hyo-Glossus. E. Genio-Hyoid. F. Mylo-Hyo'd. G. Hyo-Glossus. H. Middle Constrictor. J. Inferior do. K. Thyro-Hyoid. L. Sterno-Thyroid. M. Stylo-Hyoid. N. Stylo-Hyoid Ligament. O. Stylo-Maxillary Ligament. P. Complexus.

The chin is thrown up and the jaw and the curved line which indicates the position of the condyles of the head, are drawn small to show the muscles more distinctly. For the same purpose the Platysma-myoides and Masseter muscles are left out, and the insertion of the Temporal and the origin of the Trapezius cut away.

ARTICLE II.

*On the Physiological Action of the Muscles which control and influence the Lower Jaw.**

By Thomas Brian Gunning.

The necessity for muscles of great power, and acting upon long levers, to turn the head quickly, is demonstrated by the action of the sterno-cleido-mastoid. In very quick turning of the head the muscle acts instantaneously; this, however is but seldom. In the ordinary rotation of the head, it takes no part whatever, unless the head is obstructed as when lying down on the side. But if the head is turned far around, the muscle always acts firmly in the last part of the movement. This can be verified if the body is held upright and the forefinger placed in the interclavicular notch, with the thumb and second finger resting on the tendons of the muscles, and notice taken of the tightening and relaxation of the tendons. The comparative indifference of this muscle to the head's rotation can be more easily demonstrated in the evening, or when fatigued. From this it appears that the action of the *sterno-mastoid* in turning the head is of very secondary character. It acts only when the rotators which pass from the axis to the atlas and occipital bone, and the *splenius capitis* and *colli* of the opposite side, are already in action, and even then only to assist in turning the head quickly, to carry it further round, or to overcome obstruction. When it assists in turning the head it draws one mastoid process forward, while the splenius pulls the other mastoid process backward.

The sterno-cleido-mastoid muscle is said to be a rotator, a flexor, and an extensor of the head. What this flexing

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*Extracts of this interesting article have already appeared in the N. Y. Medical Journal. Having received from Dr. Gunning a full and correct copy we take great pleasure in presenting it to our readers. *Eds.*

of the head means, in addition to lateral movement, may be learned by the following quotation. "The sterno-mastoid muscles, when both are brought into action, serve to depress the head upon the neck, and the neck upon the chest."* These views are also maintained by J. Cruveilhier† and may be accepted as those not only of the French anatomists and physiologists generally, but also of the German and English with few exceptions. Professor Henle, however, says positively that these muscles do not flex the head down in front, and that they lift the head and bend the neck when the body is brought up in rising from the back.‡ This is a great advance upon what is said by others, but beyond this he gives no intimation of understanding their peculiar and most important function.

The insertion of the sterno-cleido-mastoid muscle is around the front of the mastoid process, and back along the superior curve line, about half the distance between the mastoid process and the centre of the occipital protuberance, while the front of the mastoid process is nearly always on a line with the centre of the condyles of the occipital bone (in rare instances, however, it is nearer the front of the condyle). The sterno-cleido-mastoid muscle is consequently inserted back of the centre upon which the head rocks (except in rare cases when a small portion of the muscle is a little forward of it). Notwithstanding this, it is set down as rocking the head forward, and the action of the muscle in rising is brought forward to prove it. This experiment, however, if properly conducted and explained, will prove the contrary. If the experimenter, while lying flat on his back, with the forefinger resting in the interclavicular notch, and the thumb and second finger on the tendons, will raise his head and shoulders a little, he will find that the muscles are acting strongly ; then

* Gray's Anatomy. 2d Amer. edit., p. 256. Phil. 1865.

† Traite d'Anatomie Descriptive. Troisieme edit., tome deuxieme, p 173. Paris. 1851.

‡ Handbuch der Muskellehre des Menschen von Dr. T. Henle, Professor der Anatomie in Goettingen. (Pege 110).

by staying in that position and rocking the head backward and forward, it will be felt that the muscles are unaffected in any part of their fibres, and that they pay no attention to the movement of the head, neither the tendons on the sternal portions nor those on the clavicular being relaxed for a moment. Then sit up, throw the head forward sufficiently to relax the tendons, and rock the head as before; it will now be found that the tendons remain relaxed, showing that tightness of the tendons did not conceal action of the muscles in the first experiment, and demonstrating that the *sterno-cleido-mastoid* muscles do *not* "serve to depress the head upon the neck." In bringing the head forward these muscles act only until the head comes to its centre of balance, when the tendons relax and remain so, even when the chin touches the breast. But if the head is obstructed in this downward movement, these muscles will then assist to bring it down in front and hold it there. The sterno-cleido-mastoid muscles do not, however, in this rock the head upon the atlas, but bring and keep the atlas forward. Neither are they "extensors of the head" in the sense indicated by the books, which seems at first sight to accord more with their insertion back of the centre of the condyles. But the insertion is so peculiar that it requires consideration to determine how the muscles affect the head. The mastoid process is always below the superior curved line upon which the back part of the muscle is inserted. When the process is large it may be more than an inch below it, although much less when the process is small, as in childhood before the cells are developed. Moreover, the uniformity of position between the mastoid processes and the condyles horizontally is not met with in their vertical relation, the condyles being on some skulls more than half an inch lower than the mastoid processes, while on others the processes are as much below the condyles, the large proportion being between these extremes. These variations go far to show that the sterno-mastoid muscles are not intended to rock the

head backward, for when the mastoid process is much lower than the condyles, and especially when it is large and projects forward somewhat, to correspond to the direction of the muscle it follows that as the head is pulled downward (by the *trapezii*, &c.) the mastoid processes go upward and forward; consequently if the *sterno-cleido-mastoid* were to act to bring the head down behind, the portion on the mastoid process—the strongest part of the muscle—would hold the head down in front, probably as much as that on the occipital bone would pull it down behind. But their action can be tested by lying down so as to remove the necessity for action of the muscles to hold the atlas. In this position (care being taken not to lift the atlas, or neck) the *sternal* portion of the muscles will not act in concert with the other muscles to rock the head back, even if the whole weight of the body is thrown upon the back of the head, and I have been unable to find any action in the clavicular portion, although the action of this part of the muscle is so delicate and prompt that it can be distinctly felt when the foot is raised in walking, the head and body being then thrown over to the other side to restore the balance. Further, when the *sterno-cleido-mastoid* and the *splenius* of the same side are acting in concert to pull the head down to the shoulder, no backward movement of the head is discoverable. *This* is conclusive, for both these muscles having similar insertions, if one rocks the head back the other must, and their combined action would be manifest if they exerted it.

It has been previously shown that this muscle acts as a *rotator* only by sometimes assisting the *splenius*, &c., of the opposite side, and as a lateral *flexor*, in connection with the *splenius* of the same side, but only when the head is obstructed, and then generally by its clavicular portion, the sternal acting only in extreme necessity. It is now seen that it does not flex the head down in *front*, that is upon the atlas, and that its action as an *extensor* of the head can not be demonstrated. The proper function of the

sterno-cleido-mastoids when acting in concert, is to give anterior support to the top of the spine, the *splenii* muscles giving posterior support. This may be easily proved by sitting down and watching the tendons. When the head is back of its centre of support both the sternal and clavicular tendons are tightened, when rising they become tenser until the head is started, as it comes into balance they relax. On sitting down, the tendons tighten to check the head as it goes back out of balance. Sudden forward movements tighten them until the head is in motion, they then slacken as the head is forward of the centre and the atlas supported by the *splenii* muscles. If the head is in balance, any pressure upon the forehead acts with increased force upon the atlas and brings the muscles into action to keep it upright. The action of the sterno-cleido-mastoid muscles in these movements is but a modification of the service rendered by them in raising the head from the horizontal position, in doing which the muscles at first support more than the weight of the head, for in supporting the mastoid processes they support the atlas, and make it a fulcrum between the bulk of the head and the counterbalance at the other end of the lever, but as the body comes upright and the head into balance, the strain upon the sterno-mastoid muscles gradually diminishes, until the head is held by the posterior muscles, when the atlas bears all the weight *vertically*.

[A reference to the figure will render this explanation more apparent. The same figure also illustrates the action of the muscles of the lower jaw, and confirms the opinions expressed in the subsequent portions of this paper.]

The hyoid bone, in addition to the muscles which pass to it from parts above the lower border of the jaw, gives attachment to others, which pass up the front of the neck below the jaw. Of these the *sterno-thyroid* arises close to the centre of the posterior surface of the upper bone of the sternum, and falling back somewhat as it passes up, is inserted into the side of the thyroid cartilage, from whence the *thyro-hyoid* (appearing like a continuation of

the preceding) goes up and is inserted into the body and greater cornu of the hyoid bone. The *sterno-hyoid* arises from the sternum and end of the clavicle and is inserted into the lower border of the body of the hyoid bone. It is separated considerably from its fellow at its origin, but crosses the sterno-thyroid and approaches it in the middle of its course; it leaves the front of the thyroid cartilege uncovered.

The *omo-hyoid* arises from the upper border of the scapula, and occasionally from the transverse ligament which crosses the supra-scapular notch. It passes across and up the side of the neck to be inserted into the body of the hyoid bone. It crosses under the *trapezius* and *sterno-cleido-mastoid* muscles but over the *scaleni* and *thyro-hyoid.* It is a double-bellied muscle united by a tendon which is held down by a process of the deep cervical fascia. The first portion is nearly horizontal in its course, but underneath the sterno-mastoid muscle, where the cervical fascia passes around the tendon, it turns up so that the second portion is nearly vertical in its course to the hyoid bone. These are the directions of the muscle when at rest, but when active it approaches the line of its attachments and the cervical fascia is drawn upward and backward.

The *digastric*, another double-bellied muscle, has peculiar relations with the preceding. It arises from the digastric notch, on the inner side of the mastoid process of the temporal bone, and passes downward, forward, and inward, to the side of the hyoid bone, where its rounded tendon (after passing through the stylo-hyoid muscle) is held by an aponeurotic loop in connection with the side of the body of the hyoid bone above the insertion of the omo-hyoid. The muscle then passes forward and is inserted into a large depression on the inner side of the lower border of the jaw close to the symphysis. The tendon which divides the posterior and longer belly from the anterior, gives off a large aponeurotic layer, which is attached to the body and great cornu of the hyoid bone; and with the

portion on the opposite side is termed the *supra-hyoid aponeurosis*, which forms a strong layer of fascia between the anterior portions of the two muscles, and a firm investment for the other muscles of this region. The *digastric* muscle is peculiar in not being inserted into the hyoid bone, but attached to it by a loop; this allows the muscle to act without interfering too much with the hyoid bone. The muscle has not, however, that freedom which is attributed to it as a reflected cord, for its aponeurotic connection with the hyoid bone and adjoining muscles prevents it from sliding through the loop which attaches it to the hyoid bone, except to a very limited extent. This powerful muscle exerts great influence from the various and important movements in which it takes part.

The last muscle to be described in this connection, the *platysma myoides*, is very distinctly separated from all the others. It is a broad thin plane of muscular fibres, immediately beneath the skin, on the side of the neck. It arises from the clavicle and acromion, and from the fascia covering the upper part of the pectorial, deltoid and trapezius muscles, and going upward and forward, it covers in the angle and the border of the jaw to the symphysis. It is inserted in the lower border of the jaw in front, but back of the commissure of the lips it is found interlaced with the muscles above. It affords muscular support to the integument, and cover to the muscles beneath, but leaves the thyroid cartilage and the front of the trachea free.

The service supposed to be rendered by the foregoing muscles is shown by the following selections.

J. Cruveilhier says: "The *sterno-hyoid*, the *omo-hyoid*, the *sterno-thyroid*, and the *thyro-hyqid* are the simplest in their structure and the simplest in their action; all coöperate to the lowering of the jaw. Moreover, if the jaw is fixed, they flex the head."*

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* Traite d'Anatomie Descriptive. 3me ed., tome 2me, p. 179. Paris, 1851.

Sappey says: "The *genio-hyoid* is the elevator of the hyoid bone when the jaw is fixed; lowerer of the jaw if the hyoid bone is motionless; flexor of the head when the hyoid bone and jaw are both fixed."*

J. Cruveilhier says of the digastric: "If the hyoid bone is fixed the posterior belly becomes the lowerer of the jaw, in consequence of the reflection of the muscle; the anterior and posterior bellies can throw the head backward."†

Jamain says: "If the hyoid bone is fixed, the digastric co-operates in lowering the jaw."‡

Todd's *cyclopædia* says: "When the hyoid bone is fixed by its depressors, and perhaps in some degree retracted by the joint actions of the posterior belly of the digastric and of the omo-hyoid, the anterior belly, both passively as a reflected cord, and actively in virtue of its muscular fibres, depresses the lower jaw, and opens the mouth."||

"Chief action of the omo-hyoids is to tighten the cervical fascia during deglutition; they are also capable of depressing the hyoid bone."¶

Gray's *Anatomy* says of the digastric, mylo-hyoid, and genio-hyoid: "When the hyoid bone is fixed by its depressors and those of the larynx, they depress the lower jaw;"** and further, that in deglutition "the anterior belly of the digastric carries the hyoid bone, &c., upward and forward and the posterior belly upward and backward," and says of the *platysma-myoides*: "Its anterior

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* Traite d'Anatomie Descriptive. Tome 1, premiere partie, p. 213. Paris, 1850.

† Traite d'Anatomie Descriptive. Troisieme edit., tome deuxieme. p 182. Paris. 1851.

‡ Nouveau Traite Elementaire d'Anatomie Descriptive. p. 180. Paris, 1853.

|| Todd's Cyclopædia. Vol. III., p. 564.

¶ Ibid. p. 563.

** Gray's Anatomy. 2d American Edition, p. 260.

portion, the thickest part of the muscle, depresses the lower jaw."*

Henle thinks: "The platysma-myoides are not depressors of the lower jaw."†

Duchenne says: "Its action being exhausted by the mobility of the integuments of the face, the neck and the chest, it has no longer sufficient strength to depress the lower jaw."‡‡

Cruveilheir says: "The platysmas are sometimes unequal in strength."‖‖

Ziemssen says: "The muscle is sometimes absent."§§

The absence of the platysma-myoides in some cases, and its inequality in others, proves that it is not of any consequence in depressing the jaw, which is a movement requiring great promptness and exactitude. It may be held between the thumb and finger, near the front of the jaw, and if care is taken to discriminate between it and the integument, it may be felt that the muscle pays no attention to the movement of the jaw.

The muscles which centre in the hyoid bone have power to control and move the organs to which they are attached, (and of which they are in several instances important parts,) subject, however, to the following limitations. The *stylo-hyoid ligament* passes down on each side from the styloid process of the temporal bone to the little horn of the hyoid bone. These ligaments have, therefore, a slanting course, while the *supra-hyoid aponeurotic layer*, between the hyoid bone and the inner side of the front of the jaw, has a horizontal direction. By this arrangement the glottis and its covering, &c., are held at some

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* Ibid. p. 256.

† Handbuch der Muskellehre des Menschen, von Dr. T Henle, Professor der Anatomie in Goettingen. p. 108.

‡ De l'Electrisation Localisee. p. 380. Paris, 1855.

§§ Traite d'Anatomie Descriptive. Troisieme edit., tome deuxieme. p. 166. Paris, 1851.

‖ Die Electricitæt in der Medicin, p. 44 Berlin, 1857.

distance from the back of the pharynx, and free respiration secured, independent of muscular action, while the hyoid bone can move upward or forward to a considerable extent, and be returned to its natural position when at rest, in any direction that is not back of this resting-place. But below this the downward, and especially the backward movements of the hyoid bone are very limited, being only what is gained by the tightening of the ligaments, &c.

Although a case is sometimes seen in which the *stylo-hyoid* ligaments give place to muscles, in others they are entirely ossified, and the temporal bones and the hyoid bone are in one piece. Showing that, depression of the hyoid below its natural position when at rest, is unnecessary, except to a trifling extent.

The digastric muscle is set down as drawing the hyoid bone backward and forward in deglutition, and as depressing the jaw by acting as "a reflected cord." These services are inconsistent with each other and with the anatomy of the parts. If it were fixed so as to draw the bone backward and forward, it could not slide and be of service as a "reflected cord" sufficiently to the lower jaw. To do the latter, the anterior belly should be inserted higher up the jaw, while a long unrestricted tendon of the muscle should run through a fixed loop on the lower border of the hyoid bone, which last should also be freed from the styloid ligaments, and be drawn down half-way to the sternum every time the jaw opened wide, and proportionally for less opening.

In respect to the united action of both bellies drawing the head backward, it is only necessary to say that the origin of the digastric is partly in front of a line drawn across, just behind the condyles of the occipital bone; it could not, therefore, draw the head back appreciably even if its insertion were directly under its origin. It is consequently a mistake to suppose it can do so when its direction forward is more horizontal than vertical. In fact

this muscle is the great agent in drawing the head *forward.* The posterior belly slants down to the hyoid bone, but the anterior is nearly horizontal in its course, and when the muscle acts it tends to the line of its attachments by drawing or endeavoring to draw the hyoid bone upward unless the jaw is much depressed, when, as the muscle is straight, or nearly so, it has no power to raise the hyoid bone. But in several important services the digastric acts in concert with the omo-hyoid. In this way the muscles passing from the hyoid bone to the front of the jaw, including the anterior belly of the digastric, are as effectually antagonized as if a powerful muscle passed from each side of the hyoid bone to the opposite cervical vertebræ, with the advantage of greater length of muscle to contract, and easier adaptation to the movements of the jaw; and the muscles in front of the hyoid bone act, when necessary, in alternation with the omo-hyoid and the posterior belly of the digastric. More frequently, however, the anterior belly of the digastric acts with the posterior belly and the omo-hyoid, for they keep the head upright. In doing this, the omo-hyoid muscle and the posterior belly of the digastric draw or hold the hyoid bone back, while the anterior belly of the digastric brings in the chin, and the *temporal* and other elevators of the jaw draw the head forward; in this way, the digastric acts on a long lever, as the head rocks on a centre, but a little below the entrance of the external ear. The digastric and omo-hyoid muscles are always active during forward or backward movements of the body or head. They do for the head, what the sterno-mastoid muscles do for the spine, and their action can be felt easily with the finger, in sitting down or rising up, &c. They are also powerful rotators of the head, and the action of the omo-hyoid is singularly quick in sudden turnings of the head, (as with the sterno-mastoid muscles,) the digastric being useful in assisting to keep the hyoid bone up in place, it

being held laterally by the aponeurosis and probably by the mylo-hyoid muscle.

If the end of the finger is placed just behind the origin of the *cleido-mastoid* during these movements, the omo-hyoid will be felt rising above the clavicle, and carrying the cervical fascia upward and backward; and if a finger is placed behind the mastoid process so as to cover the end of the digastric notch, the digastric muscle will be felt acting in concert with the omo-hyoid, and the anterior belly can be felt between the jaw and hyoid bone. The peculiar attachment of the digastric can now be appreciated, as the hyoid bone is left sufficiently free in its various movements, although it is at the same time the centre of control and support to the head. The importance of this support to the head can hardly be over-estimated, for the weight of the head beyond the atlas must be balanced. This the digastric and omo-hyoid muscles do effectually by acting upon the jaw, which is a lever whose length below the top of the atlas is over one-third of the height of the head above the atlas. The points from which these muscle act are the mastoid process and the shoulder; the vertex of their angle being in the hyoid bone, from whence they draw in the chin; in this direction they are very active and powerful. They not only balance the head in locomotion and leave the other muscles free to act in deglutition, vocalization, and articulation, but frequently coöperate with them.

(To be Continued.)

ARTICLE III.

Spontaneous Cure of Congenital Division of the Palatine Arch. Transactions of the Surgical Society.

(Translated from the French.)

M. Trélat brought forward a man 48 or 50 years old with an odd and interesting peculiarity, of which there exists, so far as he knows, no record in medical science. This pa-

tient came to consult him for a painful crepitation of the tendons. On hearing him speak, M. Trélat was struck by the intonation of his voice, closely resembling that of a person who had undergone a successful operation of staphylorrhaphy.

Examining the buccal cavity, M. Trélat saw that the soft palate had a peculiar appearance analogous to that which this organ presents after a successful operation of staphylorrhaphy. Still the patient, when interrogated repeatedly and in different ways, invariably insisted that he had never undergone the slightest operation. He only remembers that during his childhood, a surgeon had repeatedly urged his relatives to send him to Paris to be operated upon ; but this advice had not been followed. According to his statement, the cure of his congenital infirmity must have been anterior to the age of thirteen years, when he was bound out as an apprentice.

M. Trélat asked if his colleagues knew any facts of this nature, that is to say, cases of congenital fissure of the *velum palati* spontaneously healed, without a surgical operation : for his part he knew of none.

Examination of the *velum palati* of this man establishes an opinion some time since expressed by M. Trélat, viz.: that the difficulty which patients successfully operated on by staphylorrhaphy, experience in pronouncing certain words and certain letters, is caused by the shortness of the *velum palati*, which cannot come in contact with the parietes of the pharynx, whether this shortness depends on the incomplete union or the insufficiency of the *velum palati* itself, or whether it arises from insufficiency or irregularity of the developement of the palatine arch. This, instead of presenting its usual form is more or less hollowed out or contracted, offering thus the intermediate stages between simple division of the *velum pendulum palati* and simultaneous division of the velum and the palatine arch. It is one of the varieties of defective formation which is observed in this patient. Besides, the reunion of

the divided velum, whether natural or artificial, is not absolutely perfect; a slight emargination can be detected at the point. This is why the voice and the articulation in this man are not all that could be desired, and remain somewhat defective. The patient has, at no period of his life, had any disease capable of inducing perforation of the palatine arch.

M. Demarquay has had occasion to see a person who bore on his upper lip the most evident marks apparently of an operation for hare-lip, which had, nevertheless, never been performed. He was born with this scar, an incontestible evidence of the spontaneous cure of a hare-lip during intra-uterine life. This man had a child with hare-lip complicated with division of the palatine arch. As an example of the hereditary nature of this vice of conformation, M. Demarquay knows now of three children so affected who belong to the same family.

M. Verneuil knew, as every one else of the spontoneous cure of hare-lip during intra-uterine life, examples of which are not rare. He has also seen a very curious case which proves that accidental hare-lip is equally capable of cure during intra-uterine life. He has seen and deposited in the Musée Dupuytren, a fœtus whose upper lip had a hare-lip scar, while on one side of the lower lip was seen a cicatrix exactly similar, which it was difficult to regard as any thing else than an accidental traumatic division spontaneously healed.

MM. Cloquet and Guersant say that they too have seen cases of hare-lip in which nature performed the entire cure without the intervention of art.

M. Trélat did not ask his colleagues if they knew cases of spontaneous cure of hare-lip; which are not very rare and of which he himself has collected a number. What he asks for is a case similar to that of the patient subjected to the inspection of his colleagues, which is an instance of spontaneous cure, after birth, of a congenital fissure of the palate, without surgical intervention. He believes

this fact unique in science, and it is evident that none of his colleagues has seen any thing like it.

As to the facts concerning the hereditary nature of hare-lip of which M. Demarquay has spoken, they are not rare. M. Trélat knows of cases in which hereditary influence is evident in three and even five consecutive generations. Sometimes the disease leaps over one or more generations, just as other diseases thus transmissable are known to do.

M. Trélat showed his colleagues a drawing representing the velum and palatine arch of the patient who is the subject of this curious observation. The individual himself was then brought into the hall and submitted to the inspection of the members of the Surgical Society. He was then subjected to the test of reading aloud, and a defect of pronunciation similar to that observed in patients who have undergone staphylorrhaphy, was easily detected.

ARTICLE IV.

Pivot Teeth.

By the following method, which we obtained in a conversation with Dr. T. J. Thomas, a member of the late Graduating Class of the Baltimore College of Dental Surgery, artificial crowns can be attached to natural roots, and what in other cases is the exposed portion of the root, perfectly protected from the action of deleterious agents. Prepare the root, as for an ordinary wooden point; then select a plate tooth of the proper size, shape and shade, and fit it by grinding accurately to the prepared root.

After this is done enlarge the pulp canal by reaming it out as large as the root will admit: that is, make a conical shaped cavity in the exposed surface of the root, allowing the margin of this cavity to be quite near to the circumference of the root, with slight undercuts on the anterior and posterior walls.

After this cavity is prepared, and that portion of the pulp canal beyond it, filled to the apex of the root with gold, make a square metallic pivot of twenty carat gold alloyed with platinum in the proportion of five parts of gold to one of platinum. This pivot is made in two parts, which parts are soldered together at the base of the artificial crown, and slightly wedge shaped.

After this is prepared a thin piece of platinum plate is bent around the pivot, thus making a square cylinder into which the pivot perfectly fits. After this is done, carefully draw the pivot out of the square cylinder and solder the edges of the cylinder with pure gold. The pivot is then returned to the cylinder, and the excess of solder and also any rough edges which may exist on the cylinder filed off. After this is done the cavity in the root is carefully dried of all moisture and protected from saliva by means of napkins, and the square tube or cylinder, with the pivot inside of it, is placed in the centre of this cavity, which is filled around it with gold foil in as careful a manner as any crown cavity, allowing the gold to overlap the margin so as to perfectly protect all of the root from the action of deleterious agents. By such means what in the case of ordinary wooden pivot would be the exposed part of the root is perfectly protected and inclosed by the gold filling, which at the same time gives support to the square cylinder in the centre of it. In placing the cylinder in the root with the pivot in it preparatory to inserting the gold filling about it in the cavity, the split or space between the two parts composing the pivot should range directly back, from the anterior to the posterior, and not from one approximal surface to the other. When this is done the pivot is drawn out from the cylinder which remains firmly fixed in the root, and that part of the cylinder, which may project, filed down to a level with the surface of the filling. An impression of this surface is then taken with wax or gutta-percha and a die and counter-die made of fusible metal by means of which a disk of platinum plate

is swaged to fit accurately the concave surface of the gold filling in the root. When this is done, the convex surface of this disk is thinly covered with wax and the disk placed in its proper position over the gold filling in the root, and slightly pressed on it in order to obtain an impression by which to cut a square hole to correspond with the orifice of the square cylinder. After this square hole is cut in the disk, the outer end of the pivot is inserted in it, secured by means of wax, and the whole returned to the root (pivot in the cylinder) in order to make certain that the pivot is in its proper position, when it is carefully removed and secured by an investment of plaster and asbestos, in order that the pivot may be soldered to the disk.

This being done, the pivot and disk are again returned to the root and if found correct, the protruding part of the pivot above the concave surface of the disk is filed down to a level with this surface. This being done, the disk and pivot are returned to the cylinder in the root, and the plate tooth is placed in its proper position and attached to the disk by means of wax. The disk and pivot with the plate tooth thus attached are carefully removed from the root and invested in plaster and asbestos in order that a backing of gold may be made and the tooth thus soldered to it and the disk.

The tooth is now ready to be inserted, and by separating the two parts which form the pivot slighly at its apex or free extremity, this pivot will tightly fit the cylinder, the two halves acting as springs, which is the object in making the pivot of an alloy gold and platinum and also in two parts.

ARTICLE V.

Contribution to the Study of the differences between Kreosote and Carbolic Acid.

By S. C. Bensow, Royal Court Dentist of Stockholm.

Translated from the German Quarterly Journal of Dental Medicine.

As early as 1853, Gorup-Besanez showed that the genuine kreosote of Reichenbach is wholly different from any

other, as Carbolic or Phenic acid, which is also a product of the dry distillation of organic matter and which is met with in greatest abundance in coal-tar. In smell and in many other physical and chemical properties, these products are very much alike, especially when impure, and several chemists regarded phenic acid as the principal and characteristic ingredient of kreosote, and set down the word kreosote, among other appellations as a synonym of phenic or carbolic acid.

The more or less pure carbolic acid obtained from coal-tar is what is ordinarily sold for kreosote in the shops, and that for the sole reason that the rates of the medical taxes are founded upon the Druggists' price-current for kreosote, but without specifying that it shall be Reichenbach's or beech-tar kreosote which is also quoted in the Price-Current but at a much higher price. Down to our own times many doubted that any real difference existed between these two.

A. E. Hoffmann made a new examination of Reichenbach's kreosote (Journal of Practical Chemistry, 1865, p. 225,) and arrived at conclusions totally opposed to those of Gorup-Besanez and several others, saying that this kreosote is nothing but an impure phenic acid. This prompted Gorup-Besanez to a renewed investigation of a kreosote, of the purity of which he was fully convinced, viz., that from the Chemical Industrial Association in Mainz. This, in all essentials, behaved precisely as that formerly examined which he got from Blansko, a factory in Mahren now discontinued, which leads him to doubt the purity of the kreosote with which Hoffmann worked. The essential difference of Reichenbach's kreosote from carbolic or phenic acid is also established by the researches of Volkel, Hlasiwetz and H. Muller.*

The Rhenish kreosote from Mainz, though closely resem-

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*Ann. d. Ch. u. Ph., LXXVIII. p. 231; LXXXVI. p. 66 and 223; XCVI. p. 39: CII. p. 145; CVI. p. 389; Zeitschr. f. Ph. Ch. 1464, p. 703.

bling the Bohemian, and that of Mahren, is not absolutely identical with them. Subjected to a protracted digestion over a slow fire with carbonate of potash and muriatic acid, till chlorine is plentifully evolved, and it is converted into a hard, plaster-like mass after cooling, filled with gold-yellow, glittering, crystalline scales; and these crystalline bodies purified by recrystalligation from alcohol, and still further by sublimation after pressure between folds of blotting-paper, it yields, as does also the kreosote from Mahren, a hexachlorxylon, which, as may be observed in the sublimation, is a mixture of two distinct compounds. These can be separated by chloroform, one of them, $C_{16} H_4 Cl_4 O$ being soluble, and the other $C_{14} H_2 Cl_4 O_4$ insoluble in cold chloroform. In the product from Rhenish kreosote, the last is the principal component. That from the kreosote of Mahren has for its chief ingredient $C_{16} H_4 Cl_4 O_4$ and a mixture of two others, $C_{16} H_5 Cl_3 O_4$ and $C_{14} H_3 Cl_3 O_4$. The first named compounds are homologous with chlorinetted quinone and their formation from kreosote may be comprehended by the following formulæ:

$$C_{14} H_8 O_4 + 10\ Cl = C_{14} H_2 Cl_4 O_4 + 6\ H\ Cl$$
$$C_{16} H_{10} O_4 + 10\ Cl = C_{16} H_4 Cl_4 O_4 + 6\ HCl$$

The Rhenish kreosote, therefore contains the same ingredients as guiacol* (the heavy kreosote-like oil, soluble in potash-ley, obtained from the products of the dry distillation of guiacum resin) which, according to the researches of Hlasiwetz may be regarded chiefly as a mixture of $C_{14} H_8 O_4$ and $C_{16} H_{10} 0^4$, so that one is compelled to ask himself if the two products kreosote and guiacol are not identical. According to a communication from H. Muller to Gorup-Besanez, English kreosote, prepared from Swedish tar, consists mainly of $O_{16} H_{10} O_4$. The $C_{16} H_{10} O_4$ of guiacol forms with potash $C_{16} H_9 KO_4$. This compound is obtained when kreosote is briskly agitated with moderately strong

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*This appears to be the hydride of guiacyl of the French chemists, who give the formula $C_{14} H_8 O_4$. TR.

ammonia, rectified, poured into its own volume of ether, and then treated with a slight excess of a concentrated solution of potash in alcohol.

Dr. K. Frisch had also undertaken an investigation of the pure kreosote from Mainz, in consequence of the different results of Hoffmann on the one side and Gorup Besanez and others on the opposite side. The kreosote was light brown, almost colorless, of specific gravity 1.0874 at 20°, incapable of crystallization till reduced to 16°. Upon distillation, the larger portion of it went over at above 204°. Elementary analysis gave results which correspond to Volkel's empirical formula for kreasote, $C_{24} H_{14} O_5$. Its principal component is kreosol, $C_{16} H_{10} O_4$. Upon treating it with a concentrated solution of potash in alcohol, a large quantity of kreosolate of potash ($C_{16} H_9 KO_4$) is obtained. The second component of the kreosote cannot be obtained from the mother-liquor of this salt, but must be sought for by other and indirect means.

If kreosote is added drop by drop to concentrated nitric acid, there is formed, together with oxalic acid, a yellow resin-like substance, which after recrystallization from alcohol is obtained in beautiful acicular crystals, and is nothing else than picric (trinitrophenic acid.) This must come from the second component of kreosote, as kreosote gives no crystalline compound with nitric acid. If kreosote is digested with sulphuric acid, the solution diluted with water and boiled with nitric acid, there is obtained, together with oxalic acid, a second nitrogenous compound, which by its properties and by elementary analysis, shows itself to be a dinitrophenic acid. It separates as a crystalline resin, which when dissolved in ammonia and the solution decomposed by nitric acid, is obtained in prismatic crystals. Oxalic acid, according to Hlasiwets, originates from kreosol, but the nitrocompounds must arise from a phenyl combination. Gorup Besanez's Hexachlorxylon too, he found to consist of two chlorine compounds closely resembling one another in external appearances. He obtain-

ed from them chloranilic acid with several compounds of chlorine and quinine, and believes that hexchlorxylon is a mixture from Tetrachlorhydroquinone. By the continued chlorination of kreosote he obtained chloranil ($C_{12}\ Cl_4\ O_4$), so that this also proves that the second body discovered in kreosote besides kreosol, is a phenyl compound, a view confirmed by the following experiment. Dissolve kreosote in concentrated sulphuric acid and let the solution stand 24 hours at a temperature of 50°, so that when diluted with water there is no precipitate, but only a clear dark ruby-red liquid, which is decolorized by zinc. Upon neutralizing this red liquid with carbonate of baryta, filtering and evaporating the filtrate in vacuo over sulphuric acid, the sulphophenylate of baryta described by Laurent is obtained ($C_{12}\ H_6\ O\ SO_3 + HO) + (BaO\ SO_3$). The corresponding lead salt may also be obtained.

It is probable that there are several different kinds of kreosote which are mixed together, and the purified kreosote becomes richer in acid through the action of potash lye in the process of rectification. He thinks that his researches justify the assertion that kreosote may be regarded as a union of kreosol with a phenyl compound. His opinion is that kreosote in its composition resembles acid kreosolate of potash in which the potassium is represented by phenyl.

$$C_{16}\ H_{10}\ O_4\ C_{16}\ H_9\ (\ C_{12}\ H_5\ )\ O_4 + HO.$$

In an alcoholic solution of chloride of iron, pure kreosote gives a green tint, phenylic acid a brown. In a watery solution kreosote has no reaction, while phenylic acid gives the well-known blue color.

With three or four volumes of a saturated baryta water kreosote gives only an incomplete cloudy solution. Phenylic acid gives a clear solution which after standing deposits nothing or only a slight pulverulent sediment.

In liquor ammoniæ, at common temperatures, neither kreosote nor phenylic acid dissolves. On warming, kreosote still refuses to dissolve and after shaking settles out

again with a beautiful yellow tint. Phenylic acid forms a clear solution with warm aqua ammoniæ, but separates after cooling with a violet brown discoloration. In dilute potash ley both dissolve but kreosote with difficulty. Kreosote requires much ley for complete solution, otherwise a portion of the kreosote settles out during agitation as the solution cools ; addition of ley clears up the solution. Phenylic acid gives a clear and permanent solution with little ley.

To two drops of liquor ammoniæ in a test tube add a solution of chloride of iron of such strength that the precipitate is redissolved on the addition of about four volumes of water. When a few drops of kreosote are added, the solution becomes first green, then brown. Phenylic acid gives a blue or violet tint

Collodion gives with its own volume of kreosote a stiff somewhat opalescent jelly, but with phenylic acid, a viscous (dick fliessende) clear solution.

CORRESPONDENCE.

BALTIMORE, *February*, 18, 1868.

PROFESSOR GORGAS,

Dear Sir:

THE accompanying letter, just received from Paris will be read by your subscribers with much interest. I am, at present, too much engrossed by my collegiate and other duties to make experiments with the new cement. Under these circumstances, Dr. Evans will, I trust, excuse me for making public his letter *before* "having experimented." His description is so clear and points to properties so valuable, that your readers will not need to wait upon any experiments by me, or any one else. Let every one make trial for himself and then let him make known the results. Dr. Evans is indefatigable in his search into the

domains of Physical and Chemical Science, for what is practically useful to the dentist: and with a liberality characteristic of the true lover of science, he is anxious that all shall share as quickly as possible in whatever benefit may accrue from his researches.

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2 PLACE DE LA TRINITE,
PARIS, *Jan.* 30, 1868.

DEAR DOCTOR :—

I promised to inform you of any thing new or interesting, that might attract my notice, applicable to mechanical dentistry. I take great pleasure in writing to you of a new CEMENT which was presented to the Academy of science by M. SOREL, a few weeks ago.

Experimenting with it, to ascertain whether it would not be a good substitute for plaster, in making models, I find it superior. The models are not only neater and more durable; but become almost as hard as Parian marble and quite as beautiful.

The substance used is a basic hydrated oxy-chloride of magnesium. It may be obtained by slaking magnesia in a solution of chloride of magnesium, more or less concentrated. The denser the solution, the harder it becomes on drying.

This magnesian cement is the whitest and hardest of any now known and can be moulded like plaster of Paris, acquiring, as already stated, the hardness of marble. It will take any color and has been used by M. SOREL for making mosaics, imitations of ivory, billiard balls, &c.

It possesses the *agglutinative* property in the highest degree, by virtue of which it forms solid mases, when mixed, in small proportion, with certain abundant and cheap substances. With twenty times its weight of sand limestone and other inert matters, it will form hard blocks; while lime and other cements will admit of only two or three times their weight. It promises to become extremely valuable as a building material, in localities where brick and stone are scarce or expensive.

The magnesian cement may be obtained at low cost, wherever the magnesia is extracted from the mother-ley of salt-works; either by M. Balard's process, which gives magnesia and hydro-chloric acid at the same time; or by decomposing the ley by quicklime; yielding, by double decomposition, magnesia and chloride of lime—containing a certain quantity of chloride of magnesium and forming with the addition of various cheap substances, a good white-wash.

If after experimenting with this cement, you also obtain favorable results, you are at liberty to publish in the Journal of Dental Science this letter or any part of it you may think proper.

Yours very truly,

DR. D'OYLEY EVANS.

Prof. P. H. Austen, Baltimore.

Commencement Week at the Baltimore College of Dental Surgery.

THE examination of the candidates for graduation commenced on Thursday, March 5th, and were concluded by the 10th, on the evening of which day the result was announced by the Dean, to the class assembled in the Chemical Hall.

On the morning of the 10th, Dr. L. D. Shepard, one of the "Harris Lecturers" delivered the first of his lectures on "Mallet Filling," the subject being "The Theory of Mallet Filling."

On the morning of the 11th Dr. Shepard delivered his second lecture, the subject of which was "The Practice of Mallet Filling," and during the afternoon, and also on the morning of the 12th, held clinics in the Infirmary of the College.

These lectures were very interesting, and were highly appreciated by the students, while the operations performed in the clinics, were of such a character as to confirm the

high reputation of the operator. Earlier in the session Dr. James B. Bean, also one of the "Harris Lecturers" delivered several lectures on the "Aluminum Base," describing the process in such a lucid manner as to make his remarks very interesting and instructive. Dr. B. F. Arrington also delivered a lecture on the morning of the 7th of March on "Practical and Conservative Dentistry," which was listened to with great satisfaction and benefit by all present.

On the evening of the 12th of March the *Twenty-Eighth Annual Commencement* was held in the Concordia Opera House. Notwithstanding the unfavorable state of the weather the hall was densely filled by a fashionable and brilliant audience, a large majority of whom were ladies, nearly every one bore in their hands floral tokens of regard, such as bouquets, wreaths or baskets, which were bestowed upon their friends among the graduates. The Blues Band occupied the orchestra and during the evening discoursed many pleasing airs, as was testified by the applause of the audience.

After the faculty, graduates and guests had taken their seats upon the stage, the exercises were commenced with prayer by the Rev. Dr. Leyburn, which was followed by the reading of extracts from the charter of the College by the Dean, Professor F. J. S. Gorgas, who also after announcing the graduates, conferred upon the following gentlemen, twenty-seven in number, the degree of Doctor of Dental Surgery.

Newton M. Burkholder..........................Virginia.
Edwin Z. Buchen................................Maryland.
W. Leigh Burton................................Virginia.
William Sale Carruthers......................Texas.
Benjamin F. Cosby.............................Virginia.
Robert Thomas Couch.........................Virginia.
David William Crowther......................Alabama.
Charles Gray Edwards.........................Virginia.
Langston James Goree...:...................Texas.

Charles Wilson Harris........................Virginia.
George Thomas Harris........................Virginia.
John W. Holt....................................North Carolina.
John Keys, M.D..............................Virginia.
Edwin Walter L'Engle........................Florida.
George Allan McIntyre.......................Florida.
Albert Ship McLeod...........................South Carolina.
Edward Coale McSherry.......................Maryland
William Bailey Murphy.......................North Carolina.
Alexander Lee O'Brien.......................Virginia.
Rufus Hannibal Reeves.......................Tennessee.
John Doke Scott, M.D........................Virginia.
John Franklin Setzer.........................North Carolina.
George Alsop Sprinkel........................Virginia.
Thomas J. Thomas.............................Cuba.
Reuben Bossart Weiser.......................Illinois.
Basil Manly Wilkerson........................Alabama.
Edgar McClintick Williams..................West Virginia.

Of which number there were from

Maryland, 2; Virginia, 11; West Virginia, 1; North Carolina, 3; South Carolina, 1; Tennessee, 1; Alabama, 2; Texas, 2; Illinois, 1; Florida, 2; Cuba, 1.

The Valedictory Address, which was very interesting and appropriate, and which appears in the present number of the Journal, was delivered by Henry R. Noel, M.D., Professor of Physiology. Following this address, was the presentation of a valuable gold-headed cane by Mr. Judson B. Wood of Virginia, on behalf the Junior class, to Dr. Hugh McGinnis Grant, Demonstrator of Operative Dentistry; the presentation was prefaced with some very appropriate remarks, which were responded to by Dr. Grant in a pleasing and able manner.

Professor Thomas E. Bond yielding to the repeated calls of the audience as well as the graduating class, made some pointed and amusing remarks, after which the benediction was pronounced by the Rev. Dr Leyburn. All the

invited guests on the stage expressed themselves as highly pleased with the ceremonies of the evening; every thing passed off in a very pleasant manner, rendering this one of the most agreeable commencements ever held in Baltimore. The number of students in attendance on the lectures during the past session was sixty-nine.

The *twenty-ninth Annual Session* will commence on the 15th of October next.

The Missouri Dental College.

The second annual commencement of this College was held on the 26th of February, at O'Fallon Hall. The degree of Doctor of Dental Surgery was conferred upon the following three gentlemen constituting the graduating class :—John R. Mathews, Alfred C. Sloan and William L. Thomas. A respectable audience, composed of the numerous friends of the Institution, filled the Hall. A very excellent parting address to his fellow-students was given by Mr. John R. Mathews. The valedictory address was delivered by Prof. H. E. Peebles. It was full of earnest advice to the students, and gave encouragement to the friends of the College as to its future.

The number of students in attendance upon the lectures the past session was ten.

SELECTED ARTICLES.

ARTICLE VI.

Dentistry at the Paris Exposition.

A QUARTER of a century ago, we became acquainted with the experiments of a dentist, in the effort to produce artificial teeth in a continuous gum, of a natural color and appearance, and which would not warp or become fissured in use. We sometimes visited his house and laboratory—almost daily—making minute inquiries and examinations

of the materials, nature, and qualities, and progress of the work. During the last year or two we have not spoken to him, although living within a few minutes' walk of his residence, so neglectful are old friends of each other in this whirling, whirlpool city, unless stern business, or sterner illness, brings them together ; but we had heard of his sending specimens of his workmanship to the great Paris Exposition, and had been wondering in our own minds why we had not seen his name, with the grand cross of the legion of a dozen honors, we unexpectedly learned that the managers of the Exposition were not willing to place the efforts of genius, the work of professional men, with that of artificers. These labors continued for several years, through many discouragements and partial failures ; but, with a perseverance which belongs to men of true talent and high ability, he was able, at length, to arrive at a success which we felt confident would eventually be rewarded with a due appreciation, not only by the public at large, but by the dental profession of both hemispheres, which has been done. The jury on dentistry at the Champs de Mars have reported that "The specimens of 'Continuous gum sets of teeth, upon platinum plate,' by John Allen & Son, of New-York, are incomparably the most beautiful pieces exhibited." This report has been corroborated by various newspapers correspondents writing from Paris.

The New-York *Times*, of May 14th, 1867, has an article from its correspondent, saying of American dentistry, "It is beyond all competition. The display of artificial teeth, the perfect imitation of nature, in gums, and palate, or roof, are wonderful. But the French are equally great in eyes and ears."—*Journal of Health.*

MONTHLY SUMMARY.

Surgical Notes.—By Theo. A. M'Graw, M.D., Attending Surgeon to Harper Hospital.—J. W., a Scotchman, of 35 years of age, consulted me on November 19th, about a disease of the

bones of the face, from which he had suffered for about two years. He had received a blow across his nose from a falling bough, in the winter of 1865, and shortly after, in his business as a lumberman, was exposed to such a degree of cold as to make him think that he had actually frozen his head. From that time forward, he had been suffering more or less from a foul discharge from the nose, had lost a part of the alveolar process of his upper jaw, and had experienced difficulty in swallowing. Under the treatment of various physicians, he had at times been relieved of some of his most troublesome symptoms, but never cured of the disease. A month previous to his visit to Detroit, he had noticed a gradually increasing redness of the skin of his nose, and finally had become much alarmed at the appearance of an ulcer, through which pus discharged from the nasal cavities. He denied very positively having ever had any venereal disease whatever, but said he had at one time suffered for years from a chronic ulcer of the leg. On examining him, I found a defect in the alveolar process of the upper jaw, corresponding to the eye-tooth and first molar of the right side. There was a hole about as large as a quill in the soft palate. He said that it had been much larger, but had gradually contracted to its present dimensions. The skin on the bridge of the nose was ulcerated through, exposing the nasal bones, the opening being about two lines in diameter. His appetite was good and his bowels regular, though the discharge from his nose was of such an offensive, fetid nature, as to sicken everybody about him. As the ulcer was rapidly extending, and threatened to destroy the nose, I did not think it wise to delay the operation, though doubtful whether I should be able to remove the whole of the diseased tissues. Accordingly, on November 20th, assisted by Dr. Walker and Mr. McGillycuddy, a student in my office, I made a transverse incision through the integument, the cut passing directly across the ulcerous opening. Having removed the necrosed nasal bones, I inserted my forefinger through the aperture, in order to learn the extent of the disease. I found that the nasal processes of both superior maxillary bones, the ethmoid, the nasal spine of the frontal bone, all the turbinated bones, and the rostrum of the sphenoid bone, were all involved in the morbid process. The vomer had completely disappeared. With a pair of bone forceps and a gouge, I was enabled to re-

move the greater part of the diseased tissue, but was obliged to leave the cribriform plate of the ethmoid, though probably involved in the disorder, and part of the rostrum, the latter being yet firmly attached to the sound bone, and being difficult of access on account of its position. The soft parts were then drawn together, and fastened with sutures, though from their inflamed condition and the bruising which could not be avoided in the operation, I did not entertain much hope of their healing by first intention. The nostrils were syringed with a weak solution of liq. sodæ chlorinatæ several times a day. On the third day after the operation, the stitches were removed, and the parts held in apposition by adhesive plaster. Union took place, however, very slowly, and at one time the surrounding tissues became so much inflamed that I was fearful lest they should slough. The application of sedative solutions of acetate of lead and sulphate of zinc seemed to have little effect. The wound improved somewhat after being touched with a stick of nitrate of silver, but was most favorably affected by the unguentum plumbi iodidi, which I was finally induced to apply on the recommendation of Dr. Brodie. It was not, however, until the middle of December that he had sufficiently recovered to resume his usual avocation. His nose, from a rather large Roman, had, by the removal of its bony support, been changed into a not very handsome pug; but is capable of improvement by a plastic operation at some future time, when the disease shall have entirely vanished. He has still a slight discharge, for the correction of which he is to inject a weak solution of liq. sodæ chlorinatæ (ʒ i to aqua ℥ i), but is otherwise in good health.

In this case, the affection of the bones was undoubtedly of constitutional origin, though the blow on his nose and exposure to cold may have been the exciting causes. The chronic ulcer of the leg, from which he had previously suffered, was doubtless an indication of some constitutional malady, whether scrofulous or syphilitic I could not determine. I put him on a course of iodide of potassium, ten grains three times a day, in order to meet either disease.

It is to be remarked, that besides the necrosis which existed in-continuity, the patient had lost a part of the alveolar process of the upper jaw, though the bone intervening between it and

the disease in the nasal cavities was sound.—*Detroit Review of Medicine and Pharmacy.*

Poisonous Hair Washes.—The *Journal of Applied Chemistry*, has the following pertinent remarks on this topic:

"That there is a great need of better information among the common classes regarding the poisonous compounds sold under thousands of different names as hair washes, hair invigorators, and hair dyes, is constantly pressed upon our attention from many sources. Even those who should be better informed seem to be so generally thoughtless or criminally neglectful that the importance of the subject is almost totally lost sight of, unless public attention happens to be called to it by a striking example of the evil effects of those poisons. The following from the *Utica Observer*, is worth the attention of all who use any sort of dyes or artificial "restoratives" for the hair:

"The *Journal of Applied Chemistry*, for this month, asserts that paralysis has been produced by the use of lead, employed to give a dark color to hair, and says the various 'hair restoratives' so much in vogue, which contain sugar of lead, should be forever abandoned. I am induced to send to you this note from the fact that a lady recently called on me for advice in a case of paralysis of the left eyelid and tongue, caused entirely by the use of a popular hair nostrum.

She was recommended to a skillful practitioner, who will probably find great difficulty in curing the malady for it is notorious that lead is one of the most difficult poisons to expel from the human system.

But, sir, although not competent to prescribe for this rapidly increasing malady, it is easy enough to give the method for detecting the lurking fiend, which is to take one grain of iodide of potassium and drop it in a three ounce bottle of the suspected stuff; shake it slowly for a minute, and if the compound turns yellow and ropy, empty the contents of the bottle into the cesspool, no matter what it cost or by what balsamic name it is known in the advertising column."

We thank our correspondent for his communication. It touches upon a subject of more importance than the public are generally aware of. The hair restoratives containing sugar of

lead are doing the world harm, and the law should stop their manufacture and sale. One who is very dear to the writer of this paragraph has been for years an invalid, from the use, as physicians and herself are fully convinced, of a hair dye which was formerly very popular and much used. The encroachments of disease caused by the preparation referred to began with a gradual loss of power in the left arm, and thence the weakness has extended until nearly the whole system has become paralyzed. For two years the patient has not been able to leave her bed, and for nearly half that period she has been unable to speak! To nothing else than the use of hair restoratives containing sugar of lead is her present condition to be attributed. But for that she would probably be well, strong, and useful today.

We take blame to ourselves for having failed to speak strongly and often on this subject before now, and say to every one who reads this: use no hair dye which has not been carefully analyzed, and which your physician can not certify to you to be harmless. The cases are numerous wherein partial or total paralysis has resulted from the application of the villainous compounds of which we are speaking.

Carbolated Glycerine.—By GEORGE W. LAWRENCE, M.D., of Hot Springs, Arkansas.—Carbolic acid is an agent that justly merits universal medical attention. It is not my purpose to enter into its interesting progressive history, or array the names of those distinguished characters associated with RUNGE, (the discover,) in its chemical literature. Suffice it to state, that I am too thankful to have carbolic acid in its detached crystals, so separated for me from its prodigious and important relatives, from a family so complex and varied in nature, so mysteriously intimate in congeners, that a complete knowledge of petroleum, its bountiful and wonderful chemical productions, affords alone a theme, as a *speciality* for consideration. My object is simply to bring into general notice and use a preparation, which I have styled, (for the want of a better name,) *Carbolated Glycerin.* It is prepared from CALVERT's beautiful crystalline, chemically pure pyrogenous acid—not from the *crude empyreumatic fluid of commerce,* called phenol, phenic acid, carbolic acid, etc. It is

the *camphoroid* solid acid that I use in forming the *carbolate*, with PRICE'S or BOWES' inodorous glycerin. In a water bath, ranging from 100° to 130° Fahr't, I mix *one* ounce of carbolic acid (when fluid) with *nine* times (in bulk,) of pure glycerine, and agitate while hot until it is thoroughly incorporated. I find this a convenient strength for dilution when required. With this preparation and its dilutions with glycerine or water, I claim an agent that will relieve and control with more certainty and celerity, phagadena, sloughing ulcers, bed sores, chronic syphilitic, mercurio, syphilitic, and strumous ulcerations, sloughing gummates; phagadenic chancres, and all of that class of obdurate ills, more satisfactorily than any application that has come within the range of my experience. It is beneficial in cutaneous diseases of a *parasatic* origin. Diluted ten to twenty times its bulk *with pure water*, I use it with RICHARDSON'S "*Atomizer*," for all forms of aggravated ulcerated surfaces. With the "*Nephogene*," it is invaluable for nasal, faucial, tonsillar, pharyngeal, laryngeal, tracheal and bronchial ulcerations. With an adaptation I recently had made to the French instrument called the "*Irrigateur*,"—I convey at will the solution of carbolated glycerine to any part of the person. In ulcerations of the uterus and vagina, and in the treatment of follicular discases of the genitals, it is an important agent. For sinuses, ulcerations and fistulous opening in the rectum it is advantageous in its effects. I also use it for ulcerations of the external auditory channel. In caries and necrosis of the bones, wherever it can be applied, I employ with a solution of *chlorate of soda*. As an antiseptic, disinfectant, anti-parisatic, detergent, corrective and healthy stimulant, it is assuredly one of the most powerful and valuable adjuncts to our list of Remedies.—*Med. and. Surg. Reporter.*

Mental and Manual Labor.—Professor Houghton of Trinity College, Dublin, has published some curious chemical computations respecting the relative amounts of physical exhaustion propuced by mental and manual labor. According to these chemical estimates, two hours of severe mental study abstract from the human system as much vital strength as is taken from it by an entire day of mere hand work. This fact, which seems to rest upon strictly scientific laws, shows that the men who do

brain-work should be careful, first, not to overtask themselves by continuous exertion; and, secondly, that they should not omit to take physical exertion, on a portion of each day, sufficient to restore the equilibrium between the nervous and the muscular system.—*Med. and Surg. Reporter.*

Muscle Sugar.—In Aug. 1861, G. MEISSIER announced his discovery of a true sugar in muscle. Dr. J. Rauke has reinvestigated the subject and fully confirms Meissier's supposition. The following propositions are considered as established: First. That there exists a true fermentable sugar in muscle. Second. That the amount of this sugar is increased by muscular action, including tetanization caused by strychnia or electricity. Third. That the liver has no effect in causing this increase; for the sugar is proved to arise in the muscle itself, and from the muscular substance.—*Med. and Surg. Reporter.*

A Simple Method of Protecting Water from the Action of Lead Pipe.—*Dingler's Polytechnisches Journal* publishes a simple method, brought forward by Dr. Schwarz, of Breslau, for preventing the poisonous influence of lead pipes on water, by forming on the inside surface of the pipes an insoluble sulphuret of lead, which has proved so effective that, after simple distillation, no trace of lead can be detected in water which has remained in the pipes for a long time. The operation, which is a very simple one, consists in filling the pipes with a warm and concentrated solution of sulphuret of. potassium or sodium; the solution is left in contact with the lead for about fifteen minutes. Commonly, a solution of sulphur in caustic soda will answer the purpose, and produce practically the same results. It is known that sulphuret of lead is the most insoluable of all compounds of lead, and nature itself presents an example which justifies the theory of Dr. Schwarz, since water extracted from the mine of Galena does not contain lead, a fact which has often occasioned surprise.

Nervi Nervorum.—M. CHARLES ROBIN has lately announced to the Academy of Sciences that M. Sappey has discovered the *nervi nervorum*, the existence of which had been previously sus-

pected, although they had never been seen. By the aid of the microscope he has seen them in the neurilemma, the cellular and resisting membrane that forms, about each nerve, as well as about its component nerve fibres, a sort of canal in which is ledged the nervous pulp. They are very small fibres, anostomosing in every direction, and in diameter do not exceed five hundredths of a millimetre.—*Medical Gazette.*

Effects of Alcohol on Men and Animals.—Experiments made by Drs. Ringer and Rickards on the effects of alcohol on men and animals, go to show that the temperature of the body falls nearly as fast after the use of alcohol in doses sufficient to produce intoxication, as after death itself. The facility with which drunkards freeze to death, is explained by this fact. Dr. Jolly declares, that an increasing tendency towards mental disease has been generated by the increasing consumption of spirits. Official reports show, that the abuse of alcohol accounts for one-fifth of the insanity in France.—*Medical Gazette.*

Nitrous Oxide as an Anaesthetic in Surgery.—In the first number of the *Continental Gazette*, the new American newspaper just started in Paris, we find an account of the removal of a cancerous breast, by Dr. Marion Sims, in which nitrous oxide gas was used as the anæsthetic, with entire success. The patient was sixty years of age, rather stout, and of lymphatic temperament. Anæsthesia was produced in two minutes, and was kept up for sixteen minutes longer. In less than one minute after inhalation ceased consciousness was complete. There was no nausea or vomiting. The account states that after the patient was first made insensible, she was allowed to breathe some air with the gas, and was thus *returned to semi-consciousness*, and continued in this condition during the entire operation. She declared, after the operation, that while inhaling the gas, she could see Dr. Colton and Dr. Evans, (who administered it,) but felt no pain, though she experienced a kind of pushing sensation.

"There were present to witness the operation Baron Larry, Surgeon-in-chief to the Army; Sir Joseph Oliffe, physician to the British Embassy; Dr. Pratt; Dr. Vanzant; Dr. Pope, of St. Louis; Dr. Stearns, of Boston, U. S.; and some others of note, all of whom united with Dr. Sims in expression of surprise and delight at the operations of this new anæsthetic agent.

This was, perhaps, one of the operations where the patient was kept insensible for the greatest length of time with the gas, and it certainly proved eminently successful."—*Medical Gazette.*

Remarkable.—At the battle of Williamsburg, in May, 1862, Gen.——, of this place, was dangerously wounded by a minnie ball which went entirely through his face, crushing in its passage his jaw-bone and knocking out several of his jaw-teeth. From this wound he has been a constant sufferer until a few days ago, when he had extracted, from near the root of his tongue, a large jaw-tooth, where it was driven by the ball which wounded him near six years ago.— *Warrenton Sentinal.*

Sloughing Produced by Local Anaesthesia.—The *Lancet* notices a case of this kind occurring in the Middlesex Hospital, the patient being a young woman. "Mr. Lawson had diagnosticated the existence of an abscess behind the patint's breast, and as the pus was very deep (under the pectoral muscle indeed) the refrigerator was used, paraffine ether being employed. Congelation was rapidly produced, and kept up for a few minutes. The result has been, that a portion of skin, about an inch by three-quarters of an inch, over the upper part of the breast, has sloughed, and its healing will necessarily be attended by an unseemly scar. The case is certainly exceptional; but the circumstance is worth remembering when exposed parts of the body are to be operated upon."

Assimilation of Gelatin.—Most books on physiology claim that gelatin has no claim to be considered a tissue form. Dr. Charles A. Cameron, in a paper read at the recent meeting of the British Association for the advancement of science, objects to this as being too broad a statement. He points out the fact that this substance does not appear in the fæces, as it should, if it did not enter into the system, but that part of it, at least, passes off through the kidneys as urea. Animals cannot live exclusively upon it. It contains neither sulphur nor phosphorus, elements essential to the nutrition of muscles and nerves. By mixing, however, with gelatin the phosphorized and sulphuretted fats found in the brain and nervous tissue, a food is obtained capable of supporting animal life. Dr. Cameron kept a white mouse in a very healthy state for forty-two days, on a diet of this character.

Death from Chlorodyne.—On Saturday last considerable excitement was created in the town of Harleston by the report that a woman named Elizabeth Saunders had been poisoned by chlorodyne. The decease has for several years been in the employ of Mr. Thomas S. Stanton, of Mendham, who supplies this town with milk. While on her round with her milk on Saturday morning, she called on Mrs. Arnold, and as she complained to her that she was suffering from diarrhœa, Mrs. Arnold gave her a dose of chlorodyne, which had as she thought been prepared for her son, but which it turned out was undiluted. On discovering her mistake, Mrs. Arnold sent for Saunders, and gave her some antimony as an antidote. She was left, however, to go on her way, and not returning home at her usual time, inquiry was made for her, and she was found, between 10 and 11 o'clock, in a water-closet in the town, in a state of unconsciousness. Medical attendance was called in, and every attention was shown her, but she never rallied, and only lingered till 10 o'clock at night. An inquest was held on Monday morning, when a verdict of "Accidental death from an overdose of chlorodyne" was rendered.—*London News.*

The Cause of Scurvy.—The general view that scurvy is produced by an excess of common salt in the blood, occasioned by a diet of salted meat exclusively, has received some confirmation, says the London Review, in the experiments lately conducted by M. Prussak of St. Petersburg. M. Prussak placed the webb of a frog's foot under the microscope, so as to observe the passage of the blood through the smallest blood-vessels. He then injected a solution of salt beneath the frog's skin, and watched the effect on the vessels. He perceived that the blood-corpuscles distended the vessels, and gave rise to the patches of dark-colored extravasations, extremely like the peculiar livid blotches seen on the skin of scorbutic patients. Experiments on dogs and other animals appear to give the same results. It now remains to be shown why common salt should possess this peculiar action on the blood vessels. Most probably the explanation will be found in the excessive osmosis which occurs owing to the increased density of the blood.

BIBLIOGRAPHICAL NOTICES.

A Treatise on Odontalgia.—By S. Parson Shaw. London, Trubner and Co. Manchester, Palmer and Howe. Under this title the author, who has evidently received his professional education in America, explains his object to be the presentation of a work so clear and precise, that the physician, surgeon and dentist may alike be able to detect the symptoms of this affection of the teeth. That he has succeeded in his object, as far as regards many English practitioners, there can be but little doubt, while in America the work would be better suited to the public among whom our patients are to be found.

The principles laid down are in the main correct, and the author deserves credit for his efforts "to emancipate a noble profession from error and charlatanerie" and in combatting the foolish notions which patients often derive from incompetent practitioners. A just tribute is paid to Prof. Chapin A. Harris, from whose works and that of Prof. Bond quotations are made. The subject is treated of under the heads of Anatomy and Formation of the teeth; The Trifacial nerve; Decay of the Teeth; Exposure of the Pulp; Odontitis; Alveolar Abscess; Sympathetic Tooth-ache; Diagnosis of Tooth-ache; Prevention and Cure of Tooth-ache; Disease in the Antrum; Neuralgia, Tic-douloreux, &c.

The Dental Office and Laboratory. The *Dental Quarterly* hitherto edited by Dr. A. Tees and F. N. Johnson and published by Johnson & Lund, Philadelphia, has ceased to exist after reaching the 4th No. of its IV. volume, and in its place appears a monthly Dental Newspaper of eight pages with the above title. This paper presents a very neat appearance and the first number contains several able and interesting Articles, besides miscellaneous matter interesting to the profession. The publishers have our best wishes for the success of their enterprise.

EDITORIAL DEPARTMENT.

Valedictory.—In taking leave of our readers at the close of our new volume, we are happy to be able to congratulate them upon our success This has been far beyond our most sanguine expectations. Our subscription list has steadily increased, and our advertising columns have been well filled without encroaching at all upon the space devoted to reading matter. Of this we have given our subscribers more than we promised in our prospectus.

To all our patrons we return our thanks. We have honestly endeavored to give all their *quid pro quo.* To our contributors we desire to acknowledge a special indebtedness. They have enabled us to give our readers a very large amount of original matter both interesting and profitable to the profession. We ask their further assistance in the second volume of the new series, which will commence with the May number. It is our determination to make this Journal worthy of the

support of the profession everywhere. Its columns are open to all who have anything to suggest for the benefit of science.

In the next volume we propose to publish a series of articles on Anæsthetics in which the philosophy of anæsthesia will be considered, as well as the practical details of the administration of individual agents. The latest discoveries, both theoretical and practical, will be embodied in these papers.

The monthly publication, having met with general approbation, will be continued, while it demands articles of less length for each number, it furnishes readers with more recent information than the quarterly form, and elaborate papers can always be divided and published in a series.

The Harris Lectures.—These Leetures, during the past session of the Baltimore College of Dental Surgery, have proven a success, and the *Twenty-Ninth Annual Circular* just published gives the names of the following eminent practitioners, who have kindly consented to assist the Faculty in this work of Dental Education during the next Session of the College, which commences on the 15th of October, 1868.

W. H. Morgan, M. D., D.D.S., Nashville, Tennessee; W. H. Atkinson, M.D., D.D.S., New York; W. W. H. Thackston, M.D., D.D.S., Farmville, Virginia; S. H. Williams, D.D.S., Baltimore, Maryland; John Allen, M.D., D.D.S., New York; B. F. Arrington, D.D.S., Wilmington, North Carolina; Thomas B. Gunning, M.D., D.D.S., New York; Edward N. Harris, D.D.S., Boston, Massachusetts; F. Y. Clarke, D.D.S., Savannah, Georgia; B. Wood, M.D., D.D.S., Albany, New York.

Improved Saliva Pump: Codman & Shurtleff's.—During Commencement Week we witnessed the application of this Saliva Pump at the Baltimore College Infirmary, and it proved so highly satisfactory that we have introduced it into our office practice. On referring to the advertising columns of the present number of the Journal, where a cut of this instrument appears, it will be seen to consist of a glass bottle or receiver, which is attached to the back of the operating chair by means of a brass frame having teeth to enter the plush of the chair, and thus hold the bottle in position. This frame once attached to the chair, need not be removed, and the plush on the back can be protected from injury by sewing on pieces of canvas or other material, into which the teeth of the frame can be inserted. From this glass bottle, which holds about half a pint, proceed two pieces of rubber tubing, one of which is attached to a bent vulcanized rubber tube for entering the mouth over the lower front teeth, with a perforated bulb on the end to allow the saliva to enter; the other piece of tubing, proceeding from the bottle alongside of the first, has attached to it a hand bellows, similar to the spray apparatus, to be worked by the patient when the lower part of the mouth becomes filled with saliva. We have found it to be a very useful instrument and well worth a trial.

Simpson Rubber vs. Goodyear Rubber.—The following result of a recent suit in the U. S. Circuit Court of the Northern District of New York may prove of interest to many of your readers.

"In the case of Henry B. Goodyear Dental Vulcanite Co. *vs.* Dr. J. Brockway, of Albany,—which was a suit for using hard Rubber for Dental purposes, before the U. S. Circuit Court for the Northern District of New York,—an application for a preliminary injunction to restrain the Doctor from further use of the article pending the suit was set down for a hearing on Tuesday, Jan. 27, at Albany. The motion was resisted by Defendant on the ground that he was using the Simpson Dental Rubber, and not the Goodyear Rubber, or any infringement of it. Chas. F. Blake, Esq., of New York, appeared for the owners of the Goodyear Patents, and H. T. Blake, Esq., of Bridgeport, for the owners of the Simpson Patent. Affidavits had been prepared on behalf of the Defendant, disclosing the fact that the Simpson Rubber is entirely different, both as a material and in its mode of manufacture, from the Goodyear article, upon the exhibition of which the counsel for the Complainants notified the Court that he should decline to press the motion at present, as he had intended and requested and obtained an indefinite postponement of the whole matter."

Dr. Gunning's Article.—We wish to direct the especial attention of our readers to Dr. Thomas B. Gunning's Article "On the Physiological Action of the Muscles which control and influence the Lower Jaw," the first part of which appears in the present number of the Journal. The views advanced by Dr. G. are not only novel but are altogether original, and founded upon true physiological reasonings. They will no doubt, completely revolutionize the opinions hitherto obtained from our standard works upon this subject.

We shall soon present to our readers another interesting paper from Dr. Gunning on his Splints for the Treatment of Fractures of the Lower Jaw, the electrotype plates of which are now being prepared.

Obituary.—STANLEY BROWN, D.D.S. died December 16, 1867, of consumption, at his residence No. 310 F Street, Washington, D. C. Dr. Brown graduated at the Baltimore College of Dental Surgery in the Class of 1866, and we learned with sincere sorrow of his, to us, sudden and unexpected death.

During his short professional career he devoted himself with untiring energy to his calling, and as an operator bid fair to acquire a high degree of excellence. During his Collegiate life he became endeared to his classmates by the many virtues that adorned his character, and his friends have our deepest sympathy for their irreparable loss.

Want of space prevents us from answering a number of Queries which have been sent to us, but we hope to be able to reply to our correspondents in the May number of the Journal.

RULES AND REGULATIONS OF THE LIBRARY

The Library shall be open daily, except Sundays and holidays, from 9 A.M. till 1 P.M., and 2 till 5 P.M., Saturdays from 9 A.M. to 12 M., evenings from 7 to 10, except Saturdays, Sundays, and holidays.

The library is one of reference and *students* of the University have access to books and periodicals in the library room only.

Books may be taken out by officers of the School, at any time when the Library is open, unless otherwise ordered by the Librarian.

Application blanks will be provided on which must be written the full name and address of the borrower, the section or shelf number or letters, the number and title of the volume desired, and the date of application; and no book will be delivered except on presentation of such a blank properly filled out.

Only one volume at a time may be taken out, except at the discretion of the Librarian.

No volume may be retained for a longer time than is specified upon its cover, or, if no time is specified, for one week.

All books must be used and handled with care. The borrower is forbidden to write or mark in books or turn down the corners of the [illegible]es, or to tear, or in any way to injure or deface them; and any damage to, or loss of, books shall be made good to the satisfaction of the Librarian.

No books marked with one star (*) will be lent for home use except by special permission of the Librarian. No book marked with two stars (**) may in any case be taken from the Library Building. No book marked with three stars (***) may be taken from the Library Building except by the written permission of the Librarian.

All books and pamphlets must be returned to the Library on receipt of notice from the Librarian requesting their return, and a fine of twenty-five cents will be imposed for each volume not returned promptly at the time requested.

Infraction of the above rules will subject the delin[redacted] suspension of his privilege, or to such other penalty as[redacted] of the case may require.